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ABSTRACT

A project was designed to develop a system that would prepare adult vocational instructors to design, develop, and implement competency-based programs for their students. Additional objectives included identifying occupational competencies, developing and field testing vocational materials, and evaluating participating instructors' teaching competencies. The project utilized a competency-based staff development program for adult educators developed in 1975-76 at the University of Maine. The teacher-instructor competencies developed by the Center for Vocational Education at Ohio State University were selected as a basis for the program. Twenty adult vocational instructors from the Northern Maine Vocational Planning District were selected to participate. Individualized plans developed for each participant provided a basis for completion of the competencies in the various subjects represented. Among project outcomes were the following: the major objective was achieved; teachers were receptive to competence as a basis for professional evaluation and responded positively to individualized self-directed study; and though the project did not achieve its goal of developing finished modules (twelve are currently being revised and edited) for state distribution, vocational instructors in Aroostook County (Maine) became a focus for improvement in teaching. (Appendix material, which comprises the bulk of this document, includes project-related information such as a program review, lists of participants and staff, and three sample modules.) (DTT)

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Final Report

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COMPETENCY BASED ADULT VOCATIONAL EDUCATION THROUGH PERFORMANCE BASED VOCATIONAL TEACHER EDUCATION "AN IMPLEMENTATION DELIVERY SYSTEM"

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Abstract

Objectives of the Project

The project was designed to develop instructor competencies in two (2) target groups of adult instructors. They, in turn, were to produce competency based instructional materials for utilization in their adult classes. More specifically:

1. Identify two (2) groups of vocational adult instructors and develop professional teaching competencies.
2. Identify occupational competencies and develop materials for use in their vocational adult classes.
3. Field test vocational adult materials and evaluate professional teaching competencies.

Procedure or Approach

Two (2) groups of ten (10) vocational adult instructors representing adult occupational areas from the Northern Maine Vocational Planning District were selected to complete the competency based professional education sequence offered through the University of Maine at Portland-Gorham. During completion of the professional sequence materials and a structure for offering vocational adult courses based on occupational competencies was developed. Upon completion of the professional sequence, a four (4) months test period was conducted during which time instructors initiated vocational adult courses based on occupational competencies and were evaluated on their teaching competency.

Summary and Conclusions

1. The assumption that, "If an instructor is to conduct a competency based educational program, he should experience a Competency Based Teacher Education Program," appeared to be valid.
2. A procedure and/or delivery system was designed and implemented that was based on teacher competency and resulted in preparation of instructors who could design, develop and implement competency based programs for adults.
3. Teachers tend to teach as they are taught and the development of the module as the instructional vehicle for use with adults was the result of utilization of the professional vocational teacher education modules.
4. Modular materials are designed by an individual and are best

utilized by that individual in his instructional setting. Terminology, style, etc., tend to make them inappropriate for use by another instructor without his individual modification.

5. Teachers were receptive to competence as a basis for professional evaluation and responded positively to individualized self-directed study.
6. Teacher attitude towards the module as a vehicle for instruction was positive. Once teachers developed material, they used it and found it to be effective.
7. Altho the project did not achieve its goal of developing finished modules for distribution and utilization throughout the State, two (2) significant outcomes were achieved;
   a) Vocational teachers in Aroostook County became a focus for improvement of teacher education. This attention resulted in professional growth in, not only project participants, but all teachers within vocational programs as teacher competence and competency based teacher education became a prime professional concern.
   b) Procedures for self-directed study evolved and have been incorporated into the ongoing vocational teacher education program offered by the University of Maine at Portland-Gorham.

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COMPETENCY BASED ADULT VOCATIONAL EDUCATION THROUGH PERFORMANCE BASED VOCATIONAL TEACHER EDUCATION "AN IMPLEMENTATION DELIVERY SYSTEM"

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Introduction

During the past few years, increased emphasis has been placed on educational accountability as revealed by demands for competency assessment. In response to the concern, educational programs have been giving increased attention to behavioral objectives and have designed programs which stress the development of competence as the outcome of instruction.

This project was designed to address the development of a system that would result in the preparation of instructors who could design, develop and implement competency based programs for adult students enrolled in preparatory vocational programs. By definition, the prime target of preparatory vocational programming were those adults seeking entry level skills for the purposes of initial employment in a new job or new job classification. As such, it was directly aimed at the needs of the unemployed and the under-employed in the economically depressed and rural area of Aroostook County and the State of Maine. The product of the project is a cadre of teachers that are oriented to competency based programming and will prepare adult instructional programs utilizing competence as a basis.

Purposes:

The project was designed to develop within adult instructors the skills and techniques that would cause them to structure their courses and programs around competencies. More specifically:

1. Identify two (2) target groups of vocational instructors and develop professional teaching competencies.
2. Identify occupational competencies and develop materials for use in their vocational adult classes.
3. Field test vocational material and evaluate their professional teaching competencies.

Rationale:

"If an instructor is to conduct a competency based educational program, he should experience a Competency Based Teacher Education Program."

Methods and Procedures

The project was designed to develop within adult instructors the skills and techniques that would cause them to structure their courses and programs around the competency concept. The strategy utilized was

the enrollment of twenty (20) instructors in a field based delivered competency based vocational teacher education program through the University of Maine at Portland-Gorham, wherein, they would demonstrate proficiency in teaching and curriculum competencies geared towards the development and delivery of their own competency based vocational programs.

The Plan:

The project utilized a competency based staff development program for adult educators (Appendix A) as the vehicle for attainment of the project objectives. The competency based program was under development at the University of Maine at Portland-Gorham during the 1975-76 academic year and was a coordinated effort of the University, New England Competency Based Teacher Education Project in Region I, the Maine State Department of Education-Adult Division, and the Maine Association of Public School Adult Educators.

The teacher-instructor competencies developed by the Center for Vocational Education, Ohio State University were selected as a basis for the program. A committee nominated by the executive committee of the Maine Association of Public School Adult Educators screened, identified and prioritized those competencies that were specifically applicable to adult vocational educators. These competencies were then equated to, or identified with, courses (Appendix B) within the professional education component of the Bachelor's Degree Program at the University of Maine at Portland-Gorham. The professional component, a person's trade or occupational experience and the normal academic requirements were then combined into an adult option for vocational teachers.

Utilization of the developmental efforts that had gone into the identification and delivery of the competency based program for adult vocational teachers provided a vehicle to attain project objectives and a major thrust towards attaining the targeted objectives.

Figure I reveals the basic project design which evolved from the competency based vocational adult option. Twenty (20) vocational adult instructors from the Northern Maine Vocational Planning District were selected to complete the adult instructor competencies as identified and equated to courses in the University of Maine at Portland-Gorham vocational adult option. Participants represented the following occupational or vocational areas:

Target Group = Adults who are under employed or unemployed in an economically depressed rural area

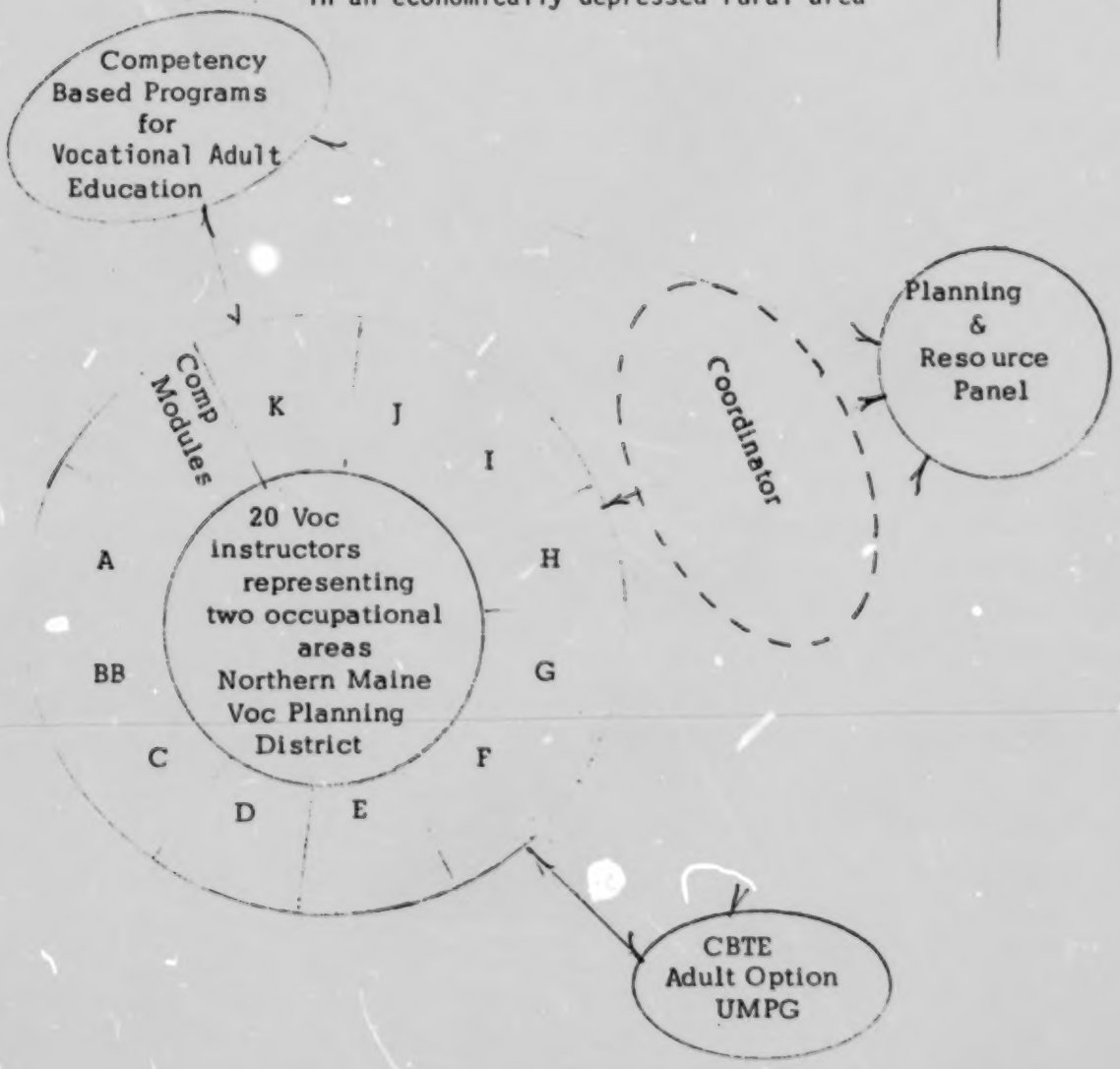


FIGURE 1

Table I

Occupational Area of Participant

Area	Number of Participants
Auto mechanics and electronics	4
Diesel-heavy equipment	2
Auto body repair	1
Health occupations	5
Masonry	1
Graphic arts	1
Building trades	3
Sheet metal	1
Office occupations	2

The directors of the three (3) regional vocational districts and the Dean of Instruction at Northern Maine Vocational-Technical Institute served as a planning resource panel, identified instructors, facilitated project operation and teacher competency development and a coordinator was employed to oversee competency development and to work with the resource panel in instructor competency evaluation.

The project consisted of two (2) phases: Phase I was designed to develop teacher competency and through the process, creation of materials and structure for vocational courses for adults, which was based on occupational competencies, and Phase II consisted of a four (4) month period of field testing materials developed. Testing occurred in the three (3) vocational administrative districts of northern Maine as well as at Northern Maine Vocational-Technical Institute, a post-secondary institution.

Results

Participant Identification and Assessment:

The resource panel identified potential project participants. They were contacted by the project coordinator and upon agreeing to participate (Appendix C) were administered a self-assessment instrument (Appendix D) in order to ascertain their current status regarding professional teacher competence. The "Self-Assessment-Competency Record" was a product of the vocational adult program development and based on a screening/prioritizing technique utilized by a committee of the Maine Association of

Public School Adult Educators. This instrument provided the program coordinator with a basis for designing an individualized program for the development of instructor competence.

Teacher Competence Development:

The individualized plan developed for each participant provided a basis for completion of competencies related to the following course titles:

IVE 300-Occupational and Trade Analysis

IVE 305-Curriculum Development in Vocational Education

IVE 310-Methods and Materials of Instruction in Vocational Education.

In addition, opportunities were provided for completion of the following additional courses if the participant completed additional work and/or demonstrated the appropriate teacher competencies:

IVE 340-Shop Organization and Management

IVE 411-Measurement and Evaluation in Vocational Education.

The basis for competency development was the self analysis made by each participant as related to director and program coordinator assessment. The vehicle utilized in development of competence was the professional vocational teacher module as developed, field tested and distributed by The Center for Vocational Education, Ohio State University. The individualized plan designed for each participant identified the participant's current status, identified those competencies to be developed and the modules and other experiences to be completed in order to develop competency. The project coordinator and local vocational director served as resource persons to the participant.

In the initial phase of the project, the project coordinator established a schedule at three (3) separate locations in Aroostook County and was available to participants serving in the resource person role. This method of operation did not prove to be successful as participants did not schedule meetings, nor utilize the coordinator, therefore commencing in January, 1977, regularly scheduled day long workshops were held monthly in order to: a) facilitate utilization of resource persons, b) develop a sense of community, c) provide continuity to development of instructional materials (modules), d) provide typing services, and e) utilize consultants and other resources.

A two (2) week pre-service vocational teacher institute was held on the Gorham Campus during August, and a three (3) session workshop held at

Houlton in November and December to further develop professional competence and to relate teacher performance to student outcomes.

Project design was based on the rationale that, "If an individual is to conduct competency based programs, he should experience a competency based teacher education program." As each participant completed the competencies identified, he was assessed and evaluated by the project coordinator and/or vocational director utilizing the "Teacher Performance Assessment" forms found in each professional vocational teacher education module and/or the criteria listed for each competency in the:

"Model Curricular for Vocational and Technical Teacher Education" Report No. V. General Objectives, set II, published by The Center for Vocational and Technical Education, the Ohio State University."

Table II indicates the titles of courses completed and the number of participants who demonstrated those competencies associated with each course.

Table II

Courses Completed by Participants

Course	Number of Participants
IVE 300-Occupational and Trade Analysis	10
IVE 305-Curriculum Development in Vocational Education	13
IVE 310-Methods and Materials of Instruction in Vocational Education	3
IVE 330-Principles and Practices of Vocational Guidance	1
IVE 340-Shop Organization and Management	13
IVE 411-Measurement and Evaluation in Vocational Education	4

Curriculum Material Development:

A second project objective was that of development of curriculum material for utilization in adult classes. Each participant was expected to develop those competencies which would permit him to identify what should be taught and to design appropriate strategies to cause learning and competency development on the part of his adult student. By project design, as a participant developed his instructor or teaching competence, he was developing and designing material for use in his adult classes.

The module, as used in development of teacher competency, was seen

as the vehicle for development of occupational competence within an adult and each participant was required to develop a module for use with adults. Through development of competencies in Occupational and Trade Analysis, the participants established the basis for adult instruction. The competencies developed in Measurement and Evaluation provided a basis for pre and post testing to assure occupational competency development, while those teacher competencies achieved through Methods and Materials provided a basis for designing strategies to cause learning to be accomplished. The basis for development of modular material was formated and sequenced, (Appendix E).

Table III lists the modules developed by participants.

Table III

Modules Developed by Participants

Laying Out Building Lines
Flaring Tubing
Alternators Repair Test
Picture Tube Installation and Removal
Pressure Checks on The 1250 Multilith
Architect's Scale
Alphabet of Lines
Brake Service
Vital Signs
Preventive Maintenance
Windshield Removal and Replacement
Key Punch Operation

Field Testing Module Material:

Field testing of module materials did not evolve as planned. Initial planning called for preliminary testing and/or utilization of material as developed and revision, editing and printing prior to final field testing; however, time lines and lack of adult classes during development caused a time lag between material preparation and testing. Therefore, only preliminary testing occurred during the spring and fall semesters. In addition, some instructors did not develop adequate competencies in order to produce curriculum materials which could be utilized and continued their developmental effort during the fall semester of 1977.

Twelve (12) modules went through the preliminary stages of testing and are currently being revised and edited by the instructors as they plan continued usage. In addition, components of modules were developed and utilized, altho the module itself was not completed. The following interview reflects the attitude of the participants towards the use of module materials with competency as the major outcome of instruction:

Ashley LeBlanc, Project Coordinator, interviewed Richard West of Northern Maine Vocational-Technical Institute on May 9, 1977 -

"Talking to Dick West, sheet metal instructor at Northern Maine Vocational-Technical Institute about the construction of his module he's going to use with his adult vocational classes some day -

Dick, could you talk a few minutes on the role of the advisory committee in developing those modules of yours.

Yes, actually what I did is, I used my advisory committee to work out my trades analysis. Through them we identify the different job skills that were required of a sheet metal worker, different competencies with both the quality and time factors that they felt were necessary to be at job-entry level skills. Through that I further broke it down into individual competencies to a point where I could start developing the modules. But I guess you could say that the biggest part of the legwork was actually done by the advisory committee itself.

Okay, the actual competencies themselves, how do they relate to parts of your trade analysis - is it a job list that your competencies equate to or is it operations that the competencies equates to?

Well, actually it would be a job list from the different skills or blocks of skills that they felt that the individual should have. We were able to break each block down into several different competencies each which in some cases overlap one another and tied back into a framework that we could use to develop individual modules from.

Okay, as far as you, an instructor using these modules, did you want to talk about one particular individual that you saw the modules being really helpful for and give us some background as to why you felt this individual should really use them. Test just gave us the situation.

Yes - this individual would be a prime example of what I run into in my trade because we have students coming from all different backgrounds, age groups, some are fresh out of high school, others have been in the service and have actually worked in the trade itself for several years. Right now we have an individual from Great Northern Paper Company running a Cooperative Education Program with Great Northern. He is here in the day-school division-five days a week for three weeks where we will try improving his basic skills and knowledge. But the modules have proved invaluable

because this particular individual has had no formal training as such on an academic level since he left high school, which he is 34 now, so he went about sixteen years. And so, through the modules the way I've developed them, I have a pre-test and this has eliminated alot of unnecessary work on my part and repetition which would be extremely boring to him. Simply by pre-testing, I'm comfortable with whether or not he has skills in a certain area - certain competency, and from there we can work on the areas that he is weak in.

You see that there is a better relationship between the reading, writing activities, the theoretical kinds of activities, the practical activities through a module that combines both of them.

Yes, because several of my modules do have live-work-type tests involved in them where the student actually has to go into the lab itself and perform a certain task and it's alot easier using a module simply because they haven't got to saw through several volumes to come up with the certain specific pieces of information. They can read four or five pages in the module and all the information is there for that particular section of work they are into related right to that skill itself. Excellent! Now, just for the benefit of people who are not following your format because your format deviates a little bit from the format that we recommend. We recommended a format not because we wanted to tie anyone to a format but we felt that some kind of a format needed to be recommended to aid those who had no idea of what format they would like to use.

Just to try to tie back what you have done to our format when we talk about learning experience - that's the theoretical kind of background information needed for a particular competency. Now in your case, you can give us an example of one particular bit of knowledge that you have learned in that module, just one paragraph, no more, and the kind of test questions you ask about that past piece of knowledge and of course the answer to it, so someone can follow through that piece right through.

Okay, I guess, in answer to your question we could use as an example this module I have in front of me and an alphabet of lines - and in this on the learning pages we describe the different lines - object lines, hidden lines, extension line, etc., with an example of each and then later on, following the learning pages or instructional information pages we do have a post-test which would cover these identical lines which we described. Okay, fine! - and you say in some of these modules, there is actually hands-on shop experience; so that would be equivalent of our learning experience too, which is kind of a mock-up experience for them to do with inexpensive materials and inexpensive in terms of time. Okay, you said something which interested me a little bit earlier about these modules are disappearing-students are taking them-I was going to ask you questions about student responses to these modules. First, how do you actually use them, do you work with a group of people in the class and assign two or three others to work on a module or-how does it work in reality in the classroom. Well, right now, in the classroom in mine as well as several of the other trades on

campus, we find that we have to completely individualize with each statement, so I have students that are at all different levels in these modules. It is structured well, probably 30% classroom and 70% hands-on. The reason these modules seem to be disappearing is that the students have to purchase several different textbooks at the beginning of each semester and then we do have a library on campus, and I found in developing the modules in order to fit the specific information that I wanted into them, I have to paw through several volumes of books both that the students had and books in the library and so forth, and it makes it alot easier for the student to just grab one of these modules, then he has all that information, without pawing through several volumes - he can more or less dig it out.

How do you find that this approach has changed your role in the classroom? There's not much chalk and talk now - and what are you doing while everyone is working on these?

Well, actually, I feel like - I don't know if my role has gone from instructor to materials to simulator or what - but there is alot more follow-up in that you've got to stay right on top of the entire group, know exactly what module they're in; this is why I've worked out a performance chart. This way I can keep track of what modules they've completed and know ahead of time what modules that they're going to next.

And this performance chart is pretty closely related to your trade analysis also then, so it all ties in. Actually, I found the whole basic thing, if a person has a trade analysis they can build, just like putting together building blocks - once a trade analysis is completed, it's just a matter of weeding out the information - putting it together into module packets and everything ties right back into this trade analysis.

Good - have you done anything to validate these learning experiences, to check and see whether what is learned in the module is - the knowledge as complete, is as quickly learned, any other criteria you want to put in as the traditional chalk and talk kind of classroom activity, that the lecture you may give, say for example, on your lines, and what have you - is this a quicker way - is it, this is more effective - is it more permanent?

I'd say 100% more effective because with the chalk and talk method you're probably reaching maybe 1/3 of the group that's unfamiliar (totally) with what you're talking about, where as the others, it's merely repetition, they're sitting there with their minds 100 miles away from actually what's going on. I can't really even see how you could compare this method - in my estimation it's far beyond the reach - because it's so much more individualized, and it's alot more incentive for the student because he can actually see where he is progressing at his own rate and this seems to bring out alot more desire in them even to the point if they can grab a module, take it to their room at night - for some reason it seems more interesting to get ahead of their neighbor than watch TV that particular evening.

That's interesting - I forgot the question I was going to ask. Any problems, any drawbacks that you can see working with these modules?

Not right off hand. There's one I can see right off - you're doing a whole lot of work before you even walk into the classroom.

The only problem as I see it is that I haven't developed a complete set of modules as yet, and if and when it's finally completed, my work is going to be 100% easier. But, actually developing and putting together the modules is a very time consuming and tedious thing. It certainly has paid for itself in the time that I spent in the modules that I have developed the work that is taken off me in my actual teaching position certainly has been worth it.

Juse one more thing on evaluation that ties this up - you talked about the role of the advisory committee, and when you talked about identifying the competencies, you said that you placed a quality and a quantity kind of standard on each one of these.

You expressed it better than I did, so maybe in answer, you'd say exactly what you'd said before. I'm interested if you have thought of using the Ohio State Scales of what they identify competency or a list of competencies down one column and have a one to five scale- do you think that this has merit?

Yes, it would - we didn't actually take that route. My advisory committee identified certain jobs that they felt were necessary for a student to be able to acquire entry level into the trade and from these jobs, we arrived at a certain set of standards, as we call them tolerances, given a particular fitting or part, to make the student, had to complete this within a certain tolerance and within a certain time limit. So it would actually be a hands-on performance-type test, and a student had to achieve the quality and the time within the set limits. If he couldn't then he was back into that particular module until he could acquire this. So, our grading on this actually followed a one to five, but the one to five were assigned time values and tolerance values.

So that's where that fitted in - that's exactly what I wanted to know from that question.

Alright - excellent - I can't think of any more. That will cover it."

Conclusions

Conclusions which can be drawn from the developmental efforts of the project are:

1. The assumption that, "If an instructor is to conduct a competency based educational program, he should experience a Competency Based Teacher Education Program," appeared to be valid.
2. A procedure and/or delivery system was designed and implemented that was based on teacher competence and resulted in preparation

of instructors who could design, develop and implement competency based programs for adults.

3. Teachers tend to teach as they are taught and the development of the module as the instructional vehicle for use with adults was the result of utilization of the professional vocational teacher education modules.
4. Modular materials are designed by an individual and are best utilized by that individual in his instructional setting. Terminology, style, etc., tend to make them inappropriate for use by another instructor without his individual modification.
5. Teachers were receptive to competence as a basis for professional evaluation and responded positively to individualized self-directed study.
6. Teacher attitude towards the module as a vehicle for instruction was positive. Once teachers developed material, they used it and found it to be effective.
7. Altho the project did not achieve its goal of developing finished modules for distribution and utilization throughout the State, two (2) significant outcomes were achieved:
   a) Vocational teachers in Aroostook County became a focus for improvement of teacher education. This attention resulted in professional growth in, not only project participants, but all teachers within vocational programs as teacher competence and competency based teacher education became a prime professional concern.
   b) Procedures for self-directed study evolved and have been incorporated into the ongoing vocational teacher education program offered by the University of Maine at Portland-Gorham. Fifteen (15) teachers in Aroostook County have continued their competency development utilizing the procedures evolved. In addition, the process is being utilized throughout the State of Maine, (Appendix F).

Appendix

A. Vocational Adult Option

B. Sample - Course with teacher competencies

C. Letter of agreement to participate

D. Self-Assessment and Competency Record

E. Module - Plan of Action

F. Personal Growth Plan

G. Participants

H. Project Staff

I. Sample modules -
   Architect's Scale
   Alphabet of Lines
   The Multilith

APPENDIX A

A. Definition of Program
- X Modified
- X Undergraduate
- X In-service
- X University funds
- X Grant funds

B. Basic Information
1. Program title: Vocational-Technical Education
2. Degree: Bachelor of Science - Major, Voc-Technical Education (adult option)
3. Objectives
   a. General
   To provide in-service education activities and experiences for vocational adult instructors to increase their classroom effectiveness and provide an opportunity to sequence these in-service experiences and activities within a collegiate program.

   This option would be consistent with the general and departmental program objectives identified on page one of the current program review.
   b. Behavioral objectives for students
   The Vocational-Technical program functions primarily on an evening and summer basis providing for the in-service and pre-service needs of individuals teaching or desirous of teaching an occupational area. Individuals selected to teach vocational adult classes possess a high degree of competency in the areas they are instructing. A student at the completion of the program - adult option - will be able to:
      1) express his philosophy of vocational-technical education and its role in the education of youth and adults both in and out of school.
      2) structure and design course and learning units appropriate for adult students and based upon an occupational analysis.
      3) demonstrate his ability to teach technical skills and information utilizing a variety of instructional strategies appropriate to adult students.
      4) evaluate the effectiveness of his instruction using appropriate standardized or teacher-made instruments.
      5) plan, organize, and administer experiences within a vocational shop or laboratory recognizing their effect on adult attitudes and instructional efficiency.
      6) exhibit desirable personal qualities necessary for successfully teaching in adult programs.
      7) relate academic and professional studies to successful vocational adult teaching.
      8) participate in professional activities as they relate to vocational-technical adult education.
4. Evidence of demand:
   a. Needs
   The Vocational-Technical Education program is designed to provide for the in-service educational needs of vocational-technical teachers in the State of Maine. The prerequisite to teach in most vocational adult areas is occupational expertise, rather than a college degree. Although these instructors possess a high degree of occupational competency, they lack a background in education and, for the most part, are weak in the area of teaching. Most adult programs maintain a high student mortality rate, due in large part to lack of training in instructional technique on the part of the instructor.

Within the last three years, emphasis has been placed on development of an adult education delivery system within and through the Bureau of Vocational Education, Maine State Department of Educational and Cultural Services.

The Bureau maintains a division of adult education responsible for stimulating, developing, and administering a state-wide program. Twenty-six administrative districts in vocational education are geographically distributed throughout the state. Each district is to employ an adult director responsible for programming in their district.

The delivery system which is currently being implemented is designed to meet the following adult needs: basic adult education; training, retraining and upgrading; apprenticeship related instruction; and industrial in-house needs.

In 1973, vocational adult enrollment was 12,000 students taught by 900 instructors. Of these, 450 were employed on a part-time basis and did not possess formal teacher education experience. In addition, there were 2,000 students receiving on-the-job training from sponsors who possessed no formal teacher training.

The apprenticeship program within Maine is operated by the Bureau of Labor. However, the responsibility for 140 hours of related instruction yearly is mandated by law to the Maine State Department of Education, Bureau of Vocational Education.

There are 1,500 registered apprentices responsible to 360 sponsors. Most of those sponsors, who provide on-the-job skills, also lack teacher education or instructor training.

Company level training programs are utilizing approximately 800 foremen and local educational agencies and an additional 200 paraprofessionals in adult instructional roles.

The delivery system as evolving is designed to coordinate the various adult education activities and foster a unified and more effective program to meet increased adult demands. Part Two - Annual and Long Range Provisions, 1975, Maine State Plan for Vocational Education, directs attention to servicing these needs and the desirability of programs to make teachers more effective. In addition, it speaks to increased personnel in the vocational adult area.

The adult option to the Vocational-Technical program was conceived and has been developed at the request of Maurice Parent, Consultant in Vocational-Adult Education, Maine State Department of Educational and Cultural Services. At his request, the Director of Vocational-Technical Education at UMPG met with the Maine Adult Education Directors in Bangor on October 29th in order to determine the need and support for such a program. They voiced enthusiastic support and a willingness to serve as a part of the teacher education in-service delivery system.

b. Anticipated enrollment

As noted in the current program review, the Vocational-Technical program is primarily in-service in nature and offers course work through the Continuing Education Division of the University. A number of voc-adult instructors are currently enrolled and the adult option would be phased

in gradually. If this option is formalized, initial enrollment would approximate 50 and it is anticipated that enrollments would grow by approximately 20% over the next two years.

1975-76	50
1976-77	60
1977-78	72

It should be noted, however, that because of design, many individuals may become involved with the program prior to formal acceptance as degree candidates.

5. Criteria for admission and retention
The same as stated in program review for Continuing Vocational-Technical Program.

6. Requirements and content of program
The requirements and content of the program in the area of general studies and the occupational or technical component would be as stated in the program review for the Continuing Vocational-Technical Program.

The professional component would include: 27 semester hours, as follows:

Curriculum Development Program Planning in Voc-Adult Education	3
Psychology of the Adult Learner	3
Methods and Techniques of Instruction in Adult Education	3
Selection and Preparation of Materials for Adults	3
Overview of Voc-Adult Education	3
Activity Analysis and Education Assessment	3
Staff Development - Clinical Experience	6
Educational Electives	3
	27 credits

Each course within the professional sequence will be broken down into teacher competencies.

Students may test out against teaching or instructional competencies, complete competencies via modules, or pursue the course. A system will be devised for awarding appropriate credit related to competency completion.

Field work - clinical experiences: An important facet of this program option is concerned with staff development. Because students enrolling in the program will be teaching adult courses, they will be afforded opportunities to test out competencies in actual situations. Adult directors at each Center and the Coordinator from UMPG will serve as coordinators of field experiences.

Staff development activities of the Bureau of Vocational Education will be coordinated with the adult option competency structure in order to assure appropriate sequencing of experiences.

Field experiences: See Continuing Vocational-Technical Program review.

7. Resources for the program
   a. Faculty
   Statements in Continuing Vocational-Technical Program review are applicable. The addition of one of the two new staff positions identified as desired would permit full implementation of the option
   4) Interdepartmental and interinstitutional cooperation
   It is conceived that the program will operate cooperatively with the Maine State Department of Education, Bureau of Vocational Education, and the 25 administrative vocational districts within the state. The

adult directors within each district will serve to coordinate in-service needs, interdepartmental, and interinstitutional cooperation.

The Maine Adult Directors Association appointed a committee on December 6, 1974 to review the 384 teacher competencies as identified by research at Ohio State and to establish a priority listing of those applicable to adult instructors. Once established, this priority listing will be integrated into the professional education component and sequence.

Statements in Continuing Vocational-Technical Program review are also applicable to this option.

b. Other
Library resources, equipment and physical space needs and secretarial support as stated in the Continuing Vocational-Technical Program review will support this option.

8. Cost estimates
   a. Each year
   No appreciable cost other than that currently identified.
   b. Program support
   See Continuing Vocational-Technical Program review. In addition, the Maine State Department of Vocational Education has indicated a willingness to make a program grant and to provide funding for a graduate assistant to serve in a coordination capacity.
   c. Program funding with no new money
   See Continuing Vocational-Technical Program review. Graduate assistant could coordinate in cooperation with Maine State Department of Education personnel and director of vocational-technical education at UMPG.
9. Relationship to mission and long range plans of the School of Education
See Continuing Vocational-Technical Program review. The Voc-Adult option is oriented towards in-service needs and servicing the state in an area which has been totally neglected.
10. Program innovation or specific to local conditions
The vocational-technical adult option is designed to meet teacher education needs of another segment of the educational community. As noted, it has been totally neglected at the undergraduate level. However, the majority of individuals employed fall into this category.

The program option is designed to recognize a student's occupational expertise and provide a basis for evaluation of it. The area of professional education provides for alternative means of achievement and is directly related to teacher roles and student field experiences.

11. How will the program be evaluated
Program evaluation is an on-going process by the Director and State Department of Education personnel. Priorities are set by the State Department based on personnel needs and the delivery system is continually evaluated against them.

Student evaluation of courses and competency modules will be sought and the Director will meet yearly with the Maine Adult Directors Association for program review. These meetings and student input will provide feedback as to program effectiveness, relevancy, and needed revisions.

EPDA SUBPROJECT

Identifying Number:_____

Adult Vocational Staff Development System

1. Institution or Agency Sponsoring Activity

University of Maine at Portland-Gorham
College of Education
College Avenue
Gorham, Maine 04038

2. Director

Richard H. Carter
Associate Professor

3. Objective(s):

Goal:

Implement, evaluate and refine the Vocational Adult Option, a delivery system for staff development of vocational adult instructors based on teacher competencies.

At the completion of this sub-project, the participant will be able to:

a. Objective No. 1: identify his current status regarding development of teacher competencies.

(Strategy)

1) Distribute teacher competency lists for analysis. Have adult instructors conduct a self-analysis and and consult with adult director regarding its accuracy.
2) Pre-test on those competencies which vocational adult instructor feels secure in.

b. Objective No. 2: maintain a progress record of teacher competencies.

(Strategy)

1) Vocational adult instructor will assist local vocational adult instructor and University Coordinator in designing and maintaining a "Competency Progress Record". Record to include competencies, courses and credits.

c. Objective No. 3: enroll in a degree program in Vocational Teacher Education

(Strategy)
Lecture from Director of Vocational-Technical Education and provide for matriculation into the professional degree program (Vocational-Adult Option).

d. Objective No. 4: select appropriate local, state, and/or university personnel for assistance in evaluation and development of teacher competencies.

(Strategy)
1) Workshop for vocational-adult instructors detailing the Adult Option and the process and procedures to be utilized in the delivery system.

2) Personal conferences with each instructor by the local Vocational Adult Education Director and University Coordinator.

e. Objective No. 5: participate in appropriate staff development workshops and activities.

(Strategy)
1) Identify staff development needs and conduct a minimum of two workshops in each Regional Center or Vocational Administrative District.

2) Modules based on teacher competencies will be made available for individual usage.

3) Offer a course within the geographic area designed to incorporate a number of teacher competencies.

4. Site and Dates of Actual Training Activity:

Workshops (tentative)
Orientation and Development
Gorham Campus
August 21-24, 1975
Staff Development
Two Regional Vocational-Technical Centers
Spring Semester 1976

Delivery System
Development and Implementation
1975-76 academic year

5. Descriptors:

Major components of the staff development effort will consist

of an orientation workshop for Vocational Adult Directors followed by selection of two demonstration sites. Forty vocational-adult instructors will be selected, oriented to the delivery system, competency evaluations made, and a record system designed.

Upon completion of the analysis and design phase, modules, courses and workshops will be created for up-grading, or developing additional teacher competencies. Feed-back will be sought in maintaining and refining the record system as well as stimulation for continued staff development activities.

6. Evaluation Strategies:

1. Feedback information will be sought from Vocational-Adult Directors and Vocational-Adult Instructors in the development implementation and refinement phases of the project.

2. Participant evaluation will be sought against the behavioral stated project objectives.

3. The Maine State Department of Educational and Cultural Services, Adult Education Division will be asked to submit a third party evaluation of the Delivery System.

7. Reporting Schedule:

Final report in June 1976 after delivery system has been implemented and third party evaluation completed.

8. Predominant Area of Vocational Education:

In-service staff development for vocational-adult instructors.

9. Number of Participants:

Forty (40) adult vocational instructors at two Regional Vocational Technical Centers.

10. Budget:

$ 14,000.00 - See budget summary sheet and budget notes.

APPENDIX B

IVE 300-Occupational and Trade Analysis

Identification of occupational or trade fields, units, operations, and items of related information.

Competencies:

32. Consult the advisory committee in planning an analysis of an occupation.
33. Analyze occupations with the assistance of employers and labor representatives.
34. Identify the competencies needed for entry into an occupation.
35. Describe the occupational standards of performance for each task in an occupation.

IVE 305-Curriculum Development in Vocational Education

This course is concerned with developing specific course content from an occupational analysis. The identification of educational needs and objectives precedes the selection and organization of relevant matter. Prerequisite: IVE 300.

Competencies:

30. Assist in the identification of the school's vocational education purposes and goals.
31. Determine the occupations for which training is to be offered in the vocational education program.
36. Assist in writing general objectives for the vocational education program offerings.
37. Develop vocational education offerings by clustering and sequencing related tasks.
38. Identify the knowledge and attitudes required for the performance of each task included in a vocational education offering.
39. Write student performance objectives for the vocational education offering.
40. Consult the advisory committee in developing a long-range program plan for vocational education.
41. Analyze long-range needs for the offerings of the vocational education program.
52. Review general objectives for the vocational education offerings.
53. Review student performance objectives developed for the vocational education offerings.
54. Sequence student performance objectives for an offering in the vocational education program.
55. Determine student needs and interests.
56. Involve the students in planning a unit.
57. Select student performance objectives for a unit.
58. Write content outline for a unit.
59. Correlate unit content with on-the-job and/or laboratory experiences.
60. Determine for a unit group and individual learning experiences based on individual differences of students.
61. Select methods of evaluating student performance throughout a unit.

IVE 310-Methods and Materials of Instruction in Vocational Education

This course treats the general and specific materials and methods of teaching vocational courses. Deals with both the theoretical and practical aspects. Prerequisites: IVE 300 and 305.

Competencies:

62. Identify the student performance objectives for a lesson.
63. Select teaching techniques for a lesson.
64. Plan the introduction of a lesson.
65. Plan the content of a lesson.
66. Plan the summary of a lesson.
67. Plan student learning experiences for a lesson.
68. Select methods of evaluating students' attainment of specific student performance objectives.
69. Write a lesson plan.
70. Obtain textbook, reference, and other instructional materials.
71. Select tools and/or equipment for a lesson.
72. Assemble consumable supplies for instructional purposes.
73. Develop original instructional materials such as individualized related assignment sheets, transparencies and chart.
76. Prepare instructional materials with a spirit duplicator.
78. Prepare instructional materials (hard copy and transparency) with a photocopier.
89. Present information through case study problems.
97. Conduct buzz groups.
100. Introduce a lesson.
101. Obtain summary for a lesson.
102. Employ oral questioning techniques.
103. Acknowledge student verbal and nonverbal cues.
105. Reinforce learning.
108. Establish frames of reference to enable the students to understand a situation from several points of view.
110. Demonstrate a manipulative skill.
111. Present a concept or principle through a demonstration.

- Select and utilize at least two (2) of the following: -

118. Present information with the assistance of a resource person.
119. Present information with bulletin boards.
120. Present information with exhibits.
121. Illustrate with models and real objects.
122. Present information with an overhead projector.
123. Present information with an opaque projector.
124. Present information with filmstrips.
125. Present information with slides.
126. Present information with sound motion pictures.
127. Present information with single concept films.
128. Present information with an audio recorder.
129. Present information with a video recorder or closed circuit television.
130. Present information with a tele-lecture.
131. Present information with a record player.
132. Present information with educational television.
133. Direct teaching-machine programmed instruction.
134. Present information by computer-assisted instruction.
135. Direct written programmed instruction.
136. Present information with the aid of a flannel board.
137. Present information with the aid of a flip chart.
138. Present information with the aid of a chalkboard.

IVE 340-Shop Organization and Management

Basic principles of planning, organizing and managing an industrial or technical shop or laboratory. Selection and arrangement of equipment including specification writing. Control of personnel for efficient shop management. Prerequisite: IVE 310

165. Compile a list of supplies needed for the academic year.
166. Identify new tools and/or equipment needed for the academic year.
167. Recommend reference books and periodicals related to vocational education that should be added to the library.

168. Prepare a capital outlay budget proposal for new equipment.
169. Plan an operating budget proposal for consumable supplies, services, and instructional materials.
170. Prepare a budget for estimating travel expenses incurred in vocational activities.
171. Arrange for additional vocational facilities to accommodate expanded enrollments and technological advancements.
172. Prepare purchase requests for approved vocational equipment and supplies.
173. Design a procedure for acquiring needed consumable supplies and materials.
175. Devise a system for determining and collecting student fees for consumable supplies.
176. Structure a filing system for records and report forms.
177. Supply the data for vocational reports required by the state department of education.
178. Devise a filing system for instructional materials.
179. Devise a system for maintaining occupational opportunity information for use by vocational students.
180. Record vocational student attendance according to school policy.
181. Record vocational students' grades according to school policy.
182. Assemble individual student files documenting personal characteristics, attitudes, and grades.
183. Provide approved safety apparel and devices for vocational students assigned to hazardous equipment.
184. Establish a procedure for attending to the first aid needs of vocational students.
185. Maintain a record of safety instruction presented in compliance with safety laws and regulations.
187. Formulate with students acceptable standards of behavior in vocational classrooms and laboratories.
192. Maintain an inventory of vocational tools, supplies, and equipment.
193. Establish a system for repairing and servicing tools and equipment in the laboratory.
194. Arrange for the storage and security of supplies and equipment.
195. Implement student check-out procedures for tools, supplies, and equipment used in the laboratory.
196. Direct students in a system for cleaning and maintaining the laboratory.
197. Schedule laboratory equipment for maximum utilization by students.
198. Arrange layout of the vocational laboratory to simulate the occupational environment.
199. Arrange laboratory work areas and storage space to facilitate student work performance.
200. Control heat, light, and ventilation in vocational laboratories and classrooms.
201. Establish a policy for use of the physical facilities and equipment by other school personnel and outside groups.

IVE 411-Measurement and Evaluation in Vocational Education

The construction, selection, and use of achievement and performance tests in industrial-technical education. Skill in writing test items is developed. Elementary statistics for the industrial-technical instructor, including grading, are stressed. Prerequisites: IVE 300 and 310.

35. Describe the occupational standards of performance for each task in an occupation.
36. Assist in writing general objectives for the vocational education program offerings.
38. Identify the knowledge and attitudes required for the performance of each task included in a vocational education offering.
39. Write student performance objectives for the vocational education offering.

52. Review general objectives for the vocational education offerings.
53. Review student performance objectives developed for the vocational education offerings.
54. Sequence student performance objectives for an offering in the vocational education program.
61. Select methods of evaluating student performance throughout a unit.
139. Establish criteria for student performance.
140. Formulate a system of grading consistent with school policy.
141. Appraise students' products according to occupational performance standards.
142. Appraise students' performance in relation to student performance objectives.
143. Evaluate individualized assignments completed under directed study.
144. Devise self-evaluation techniques for use by students.
145. Arrange for students to evaluate their own progress.
146. Engage in cooperative evaluation of achievement with students.
147. Determine students' grades based on related instruction and laboratory or on-the-job experience.
148. Interpret students' evaluation of instruction.
149. Formulate essay test items.
150. Formulate true-false items.
151. Formulate completion test items.
152. Formulate matching test items.
153. Formulate multiple-choice test items.
154. Devise laboratory performance tests.
155. Devise laboratory performance rating sheets.
156. Formulate test items for an oral test.
157. Administer teacher-made tests.
159. Analyze tests for validity.
160. Analyze tests for reliability.
161. Review student progress and/or achievement records to assess effectiveness of instruction.
162. Involve students in formulating the procedures for their participation in the evaluation of instruction.
163. Obtain information from fellow teachers and supervisory personnel regarding the quality of one's instruction.
164. Seek opportunities for self-evaluation of instruction.

APPENDIX C

CBVAE-CBVTE

Competency Based Adult Vocational Education Through
Competency Based Vocational Teacher Education

I am employed in the

_____

_____

_____

as an instructor of _____.

I agree to participate in the research project in CBAVE and will complete the professional teacher education program and develop a competency based module for use in my adult education classes during the fall of 1977. For my efforts I will receive appropriate University credit for the professional competencies developed.

_____

Name Date

APPENDIX D

ADULT VOCATIONAL TEACHER EDUCATION

PERFORMANCE ELEMENTS

SELF DIAGNOSIS ASSESSMENT ANALYSIS AND COMPETENCY RECORD

I. Program Planning, Development, and Evaluation

3.	Obtain administrative approval for conducting a community survey.	—	—	—
5.	Adapt existing community survey materials to local needs.	—	—	—
6.	Consult the chamber of commerce to identify area employers to be contacted in a community survey.	—	—	—
9.	Involve the steering committee in conducting a community survey.	—	—	—
11.	Establish communication with employer representatives who will be involved in a community survey.	—	—	—
15.	Direct students in the collection of data for a community survey.	—	—	—
16.	Collect occupational data from employers to identify vocational education needs.	—	—	—
17.	Collect student occupational interest data to identify vocational education needs.	—	—	—
18.	Recommend a vocational education program based on the findings of a community survey.	—	—	—
24.	Publicize to the school and community the establishment of the advisory committee, its members, and its function.	—	—	—
25.	Orient the advisory committee members to their role and function.	—	—	—
27.	Communicate the date, place, and agenda for the advisory committee meetings to all persons concerned.	—	—	—
29.	Serve as the liaison for the advisory committee and the school administration.	—	—	—
30.	Assits in the identification of the school's vocational education purposes and goals.	—	—	—
32.	Consult the advisory committee in planning an analysis of an occupation.	—	—	—

33. Analyze occupations with the assistance of employers and labor representatives. — — —

34. Identify the competencies needed for entry into an occupation. — — —

35. Describe the occupational standards of performance for each task in an occupation. — — —

36. Assist in writing general objectivess for the vocational education program offerings. — — —

37. Develop vocational education offerings by clustering and sequencing related tasks. — — —

38. Identify the knowledge and attitudes required for the performance of each task included in a vocational education offering. — — —

39. Write student performance objectives for the vocational education offering. — — —

41. Analyze long-range needs for the offerings of the vocational education program. — — —

42. Specify the long-range facility, equipment, and supply needs for the vocational education program. — — —

45. Assist in preparing the long-range program plan for vocational education. — — —

46. Analyze continual follow-up information on the placement, employment, and training status of each graduate of the vocational education program. — — —

47. Obtain follow-up data from employers of graduates of the vocational education program. — — —

48. Determine the reasons students leave the vocational education program. — — —

49. Review supervisory evaluation reports for assessing the vocational education program. — — —

50. Assess the relevancy of the vocational education offerings. — — —

51. Disseminate a summary of the vocational education program evaluation to administrators, advisory committee members, and members of the board of education. — — —

II. Planning of Instruction (Chapter III, page 33)

52. Review general objectives ofr the vocational education offerings. — — —

53. Review student performance objectives developed for the vocational education offerings. — — —

54. Sequence student performance objectives for an offering in the vocational education program. — — —

55. Determine student needs and interests. — — —

56. Involve the students in planning a unit. — — —

57. Select student performance objectives for a unit. — — —

58. Write content outline for a unit. — — —

59. Correlate unit content with on-the-job and/or laboratory experience. — — —

60. Determine for a unit group and individual learning experiences based on individual differences of students. — — —

61. Select methods of evaluating student performance throughout a unit. — — —

62. Identify the student performance objectives for a lesson. — — —

63. Select teaching techniques for a lesson. — — —

64. Plan the introduction of a lesson. — — —

65. Plan the content of a lesson. — — —

66. Plan the summary of a lesson. — — —

67. Plan student learning experiences for a lesson. — — —

68. Select methods of evaluating students' attainment of specific student performance objectives. — — —

69. Write a lesson plan. — — —

70. Obtain textbook, reference, and other instructional materials. — — —

71. Select tools and/or equipment for a lesson. — — —

72. Assemble consumable supplies for instructional purposes. — — —

73. Develop original instructional materials such as individualized related assignment sheets, transparencies, and charts. — — —

74. Involve students in the preparation of instructional materials. — — —

75. Obtain programmed instructional materials. — — —

76. Prepare instructional materials with a spirit duplicator. — — —

III. Execution of Instruction (Chapter IV, page 43)

80. Direct students in gathering information from sources in the community. — — —

82. Conduct brainstorming sessions. — — —

83. Direct student presentations. — — —

84. Direct students in instructing other students. — — —

85. Direct simulation techniques. — — —

86. Conduct group supervised study. — — —

87. Direct student laboratory experience. — — —

88. Direct students in applying problem-solving techniques. — — —

89. Present information through case study problems. — — —

90. Present information by the project method. — — —

91. Direct student study of textbooks, bulletins, and pamphlets. — — —

92. Direct student study of information and assignment sheets. — — —

93. Direct students in preparing laboratory work or job plans. — — —

94. Guide student progress through the use of operation and/or job sheets. — — —

95. Lead group discussions. — — —

96. Conduct panel discussions. — — —

99. Employ role-playing techniques. — — —

100. Introduce a lesson. — — —

101. Obtain summary for a lesson. — — —

102. Employ oral questioning techniques. — — —

103. Acknowledge student verbal and nonverbal cues. — — —

104. Enrich instruction to challenge the abilities of the more capable student. — — —

105. Reinforce learning. — — —

107. Employ reward techniques. — — —

108. Establish frames of reference to enable the students to understand a situation from several points of view. — — —

109. Apply nonverbal techniques. — — —

110. Demonstrate a manipulative skill.th — — —

111. Present a concept or principle through a demonstration. — — —

112. Give a lecture. — — —

113. Give an illustrated talk. — — —

114. Present information with analogies. — — —

115. Present information by use of individualized instruction. — — —

116. Present information through team teaching. — — —

117. Give an assignment. — — —

118. Present information with the assistance of a resource person. — — —

119. Present information with bulletin boards. — — —

120. Present information with exhibits. — — —

121. Illustrate with models and real objects. — — —

122. Present information with an overhead projector. — — —

123. Present information with an opaque projector. — — —

124. Present information with filmstrips. — — —

125. Present information with slides. — — —

126. Present information with sound motion pictures. — — —

127. Present information with single concept films. — — —

128. Present information with an audio recorder. — — —

129. Present information with a video recorder or closed circuit television. — — —

132. Present information educational television. — — —

137. Present information with the aid of a flip chart. — — —

138. Present information with the aid of a chalkboard. — — —

IV. Evaluation of Instruction (Chapter V, page 67)

139. Establish criteria for student performance. — — —

140. Formulate a system of grading consistent with school policy. — — —

141. Appraise students' products according to occupational performance standards. — — —

142. Appraise students' performance in relation to student performance objectives. — — —

143. Evaluate individualized assignments completed under directed study. — — —

144. Devise self-evaluation techniques for use by students. — — —

145. Arrange for students to evaluate their own progress. — — —

146. Engage in cooperative evaluation of achievement with students. — — —

147. Determine student' grades based on related instruction and laboratory or on-the- job experience. — — —

148. Interpret students' evaluation of instruction. — — —

149. Formulate essay test items. — — —

150. Formulate true-false test items. — — —

151. Formulate completion test items. — — —

152. Formulate matching test items. — — —

153. Formulate multiple-choice test items. — — —

154. Devise laboratory performance tests. — — —

155. Devise laboratory performance rating sheets. — — —

156. Formulate test items for an oral test. — — —

157. Administer teacher-made tests. — — —

158. Devise case study problems. — — —

159. Analyze tests for validity. — — —

160. Analyze tests for reliability. — — —

161. Review student progress and/or achievement records to assess effectiveness of instruction. — — —

162. Involve students in formulating the procedures for their participation in the evaluation of instruction. — — —

163. Obtain information from fellow teachers and supervisory personnel regarding the quality of one's instruction. — — —

164. Seek opportunities for self-evaluation of instruction. — — —

V. Management (Chapter VI, page 79)

165. Compile a list of supplies needed for the academic year. — — —

166. Identify new tools and/or equipment needed for the academic year. — — —

167. Recommend reference books and periodicals related to vocational education that should be added to the library. — — —

169. Plan an operating budget proposal for consumable supplies, services, and instructional materials. — — —

170. Prepare a budget for estimating travel expenses incurred in vocational activities. — — —

172. Prepare purchase requests for approved vocational equipment and supplies. — — —

173. Design a procedure for acquiring needed consumable supplies and materials. — — —

174. Accept gifts or donations of supplies and equipment for the vocational education program in accordance with school policy. — — —

175. Devise a system for determining and collecting student fees for consumable supplies. — — —

176. Structure a filing system for records and report forms. — — —

177. Supply the data for vocational reports required by the state department of education. — — —

178. Devise a filing system for instructional materials. — — —

179. Devise a system for maintaining occupational opportunity information for use by vocational students. — — —

180. Record vocational student attendance according to school policy. — — —

181. Record vocational students' grades according to school policy. — — —

182. Assemble individual student files documenting personal characteristics, attitudes, and grades. — — —

183. Provide approved safety apparel and devices for vocational students assigned to hazardous equipment. — — —

184. Establish a procedure for attending to the first aid needs of vocational students. — — —

185. Maintain a record of safety instuction presented in compliance with safety laws and regulations. — — —

186. Uphold school standards of expected student behavior. — — —

187. Formulate with students acceptable standards of behavior in vocational classrooms and laboratories. — — —

188. Uphold acceptable standards of student behavior in vocational classrooms and laboratories. — — —

189. Carry out approved disciplinary action when warranted. — — —

190. Encourage students to exercise self-discipline. — — —

192. Maintain an inventory of vocational tools, supplies, and equipment. — — —

193. Establish a system for repairing and servicing tools and equipment in the laboratory. — — —

194. Arrange for the storage and security of supplies and equipment. — — —

195. Implement student check-out procedures for tools, supplies, and equipment used in the laboratory. — — —

196. Direct students in a system for cleaning and maintaining the laboratory. — — —

197. Schedule laboratory equipment for maximum utilization by students. — — —

198. Arrange layout of the vocational laboratory to simulate the occupational environment. — — —

199. Arrange laboratory work areas and storage space to facilitate student work performance. — — —

200. Control heat, light, and ventilation in vocational laboratories and classrooms. — — —

VI. Guidance (Chapter VIII, page 93)

203. Administer subject-matter diagnostic tests. — — —

210. Maintain an open door policy for student consultation. — — —

211. Encourage students to discuss career aspirations. — — —

212. Demonstrate a regard for and an interest in students as individuals. — — —

213. Develop constructive working rlationships among students. — — —

216. Recognize potential problems of students. — — —

217. Conduct a conference with a student. — — —

218. Conduct group conferences. — — —

220. Interpret occupational tests and inventories to students. — — —

221. Assist students in developing good study habits. — — —

222. Establish communication patterns for exchanging information and for cooperating with the guidance staff. — — —

224. Refer students to guidance staff and other specialists. — — —

227. Refer students to qualified resource persons for occupational and educational information. — — —

230. Present information to students on occupational opportunities. — — —

231. Present information to students on advanced training and education at opportunities available to them. — — —

232. Assist students in determining ways to best describe their salable skills. — — —

233. Write letters of recommendation for students. — — —

234. Assist graduating students in preparing for interviews with potential employers. — — —

VII. School-Community Relations (Chapter VIII, page 107)

239. Express a philosophy consistent with that of the vocational faculty. — — —

240. Speak to school and community groups about the vocational education program. — — —

242. Provide displays in the school and community about the vocational education program. — — —

247. Conduct an open house to familiarize members of the school and community with activities of the vocational education program. — — —

250. Assist with community business and industry sponsored activities. — — —

253. Provide consultant services to local business and industry. — — —

254. Maintain liaison with union officails and employers. — — —

255. Maintain liaison with employment agencies. — — —

257. Maintain good relations with other schools. — — —

259. Obtain informal feedback on the vocational education program through contacts with individuals in the school and community. — — —

263. Consult the advisory committee to obtain information concerning their expectations of the vocational education program. — — —

265. Study community voting results on financial issues affecting the vocational education program to determine community support. — — —

267. Maintain working relationships with the school administration and faculty. — — —

268. Assist in planning the goals of the total school program. — — —

269. Maintian working relationships with the school supporting staff through cooperation and mutual effort. — — —

IX. Professional Role and Development (Chapter X, page 131)

299. Identify current trends of the teaching profession. — — —

300. Promote the attainment of the goals of the teaching profession. — — —

301. Express a personal professional philosophy consistent with the goals of the teaching profession. — — —

302. Express a personal professional philosophy consistent with the goals of vocational education. — — —

303. Maintain the ethical standards expected of a professional educator. — — —

304. Exchange observational visits, innovations, and ideas with others in the professions. — — —

305. Support professional organizations through membership and attendance at meetings. — — —

306. Serve professional organizations as an officer and/or chairman or member of a committee. — — —

307. Represent the teaching profession as a committee member, delegate, or program participant at meetings and activities of other related professions. — — —

308. Participate in experimental and other data collecting research activities. — — —

310. Assist in orienting teachers who are new to the school system. — — —

312. Serve community needs by contributing professional expertise to community activities. — — —

313. Consult supervisory and administrative evaluations to determine attitudes of others toward one's personal and professional abilities and limitations. — — —

314. Use a self-analysis form to evaluate personal and professional abilities and limitations. — — —

315. Select the teaching position which is in keeping with personal and professional abilities and limitations. — — —

316. Maintain professional certification through enrolling in graduate, extension, and in-service education programs. — — —

318. Keep up-to-date through reading professional literature. — — —

319. Acquire new occupational skills and information needed to keep pace with technological advancement in vocational education. — — —

320. Update professional personnel file regularly. — — —

X. Coordination (Chapter XI, page 143)

331. Establish criteria for selection of student-learners. — — —

332. Provide prospective student-learners with resource materials on occupational opportunities to aid them in selecting a vocation. — — —

339. Establish criteria for evaluating the training station potential of a business or industry. — — —

340. Identify prospective cooperating employers to provide on-the-job training stations. — — —

341. Establish criteria to evaluate qualifications of prospective on-the-job instructors. — — —

342. Assess training capability of the on-the-job instructor of the prospective training stati;n. — — —

343. Assess educational adequacy of the prospective training station's facilities and equipment. — — —

344. Assess safety provisions of the facilities and equipment of the prospective training station. — — —

345. Convince an employer to provide a training station for cooperative vocational education. — — —

346. Arrange with a union to make contract provisions for student-learners. — — —

347. Develop a training agreement between student-learner, parent, school, and cooperating employer. — — —

348. Arrange school and work schedules with student-learners and school and employing personnel. — — —

349. Develop a systematic training plan with the cooperating employer and/or on-the-job intructor. — — —

358. Assist the student-learner in on-the-job training orientation. — — —

359. Assist the cooperating employer's personnel in accepting the training status and role of the student-learner. — — —

360. Maintain good working relationships with training station personnel. — — —

361. Develop a procedure to insure student's safety and protection in the training station. — — —

362. Develop a plan for supervision of on-the-job training. — — —

363. Inform the administration of the coordination itinerary. — — —

364. Assess the on-the-job experience daily reports with the student-learner to plan future instruction. — — —

365. Encourage the on-the-job instructor to follow the training plan in providing experiences for the student-learner. — — —

366. Maintain the student-learner's progress reports for on-the-job training and related instruction. — — —

367. Examine the student-learner's progress reports to determine future on-the-job training experiences and related instruction. — — —

368. Maintain a record of individual work hours, wages, and work experiences of on-the-job training. — — —

369. Assist the student-learner in the solution of problems related to on-the-job training. — — —

372. Conduct terminiation procedures for on-the-job training for the student-learner when conditions demand it. — — —

374. Evaluate the student-learner's work qualities and habits on the job. — — —

375. Evaluate the student-learner's personal traits and characteristics on the job. — — —

376. Check the student-learner's progress in acquiring skills on the job. — — —

377. Check the student-learner's progress with the on-the-job instructor and other training station personnel. — — —

378. Assess the student-learner's performance with the assistance of the on-the-job instructor. — — —

379. Obtain suggestions from the on-the-job instructor to guide the selection of lessons for related instruction. — — —

380. Evaluate the quality of the on-the-job training received by the student-learner. — — —

382. Assist the on-the-job instructor with development of teaching techniques during supervisory visits to the training station. — — —

383. Update related instruction for student-learners on the basis of information on technology obtained from cooperating employers. — — —

384. Obtain information from the advisory committee on ways to improve related instruction and on-the-job training. — — —

NAME_____DATE_____

ADDRESS_____TELEPHONE_____

_____

_____

SCHOOL_____

ADDRESS_____TELEPHONE_____

_____

_____

POSITION_____

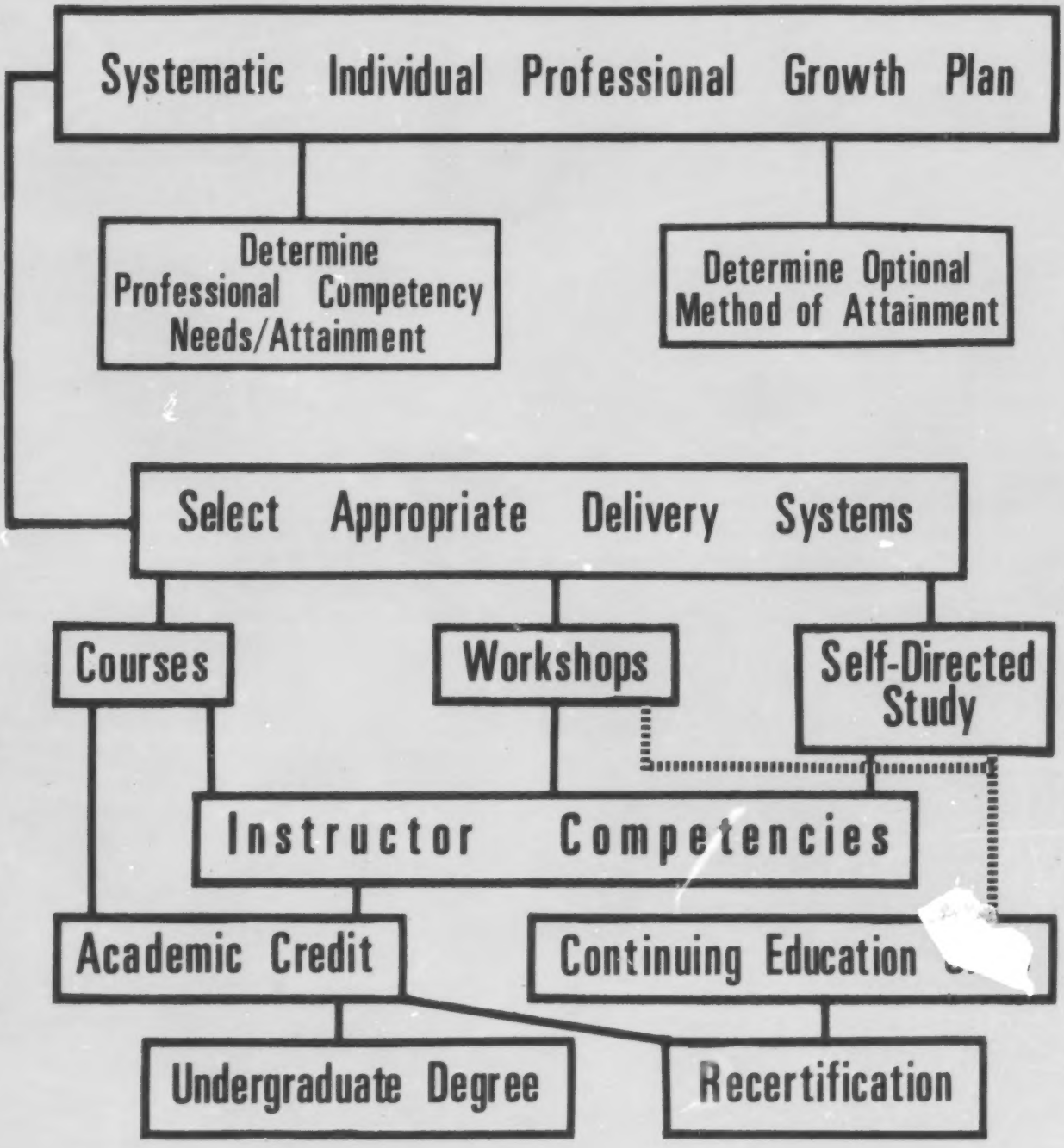
APPENDIX E

MODULE - PLAN OF ACTION

1. Isolate the target group
2. Prepare a Trade Analysis using your own knowledge of the occupation and your craft committee.
3. List the tasks (jobs-operations-competencies) that are to be taught or improved.
4. Select objectives - qualitative and quantative
5. Secure training materials
6. Decide teaching strategies
7. Execution of instruction
8. Evaluation of instruction

APPENDIX F

University of Maine at Portland - Gorham
College of Education Center for Industrial Education & Technology



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APPENDIX G

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Caribou, Maine

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James Patterson
Dean of Instruction
Northern Maine Vocational-Technical Institute
Presque Isle, Maine

APPENDIX I

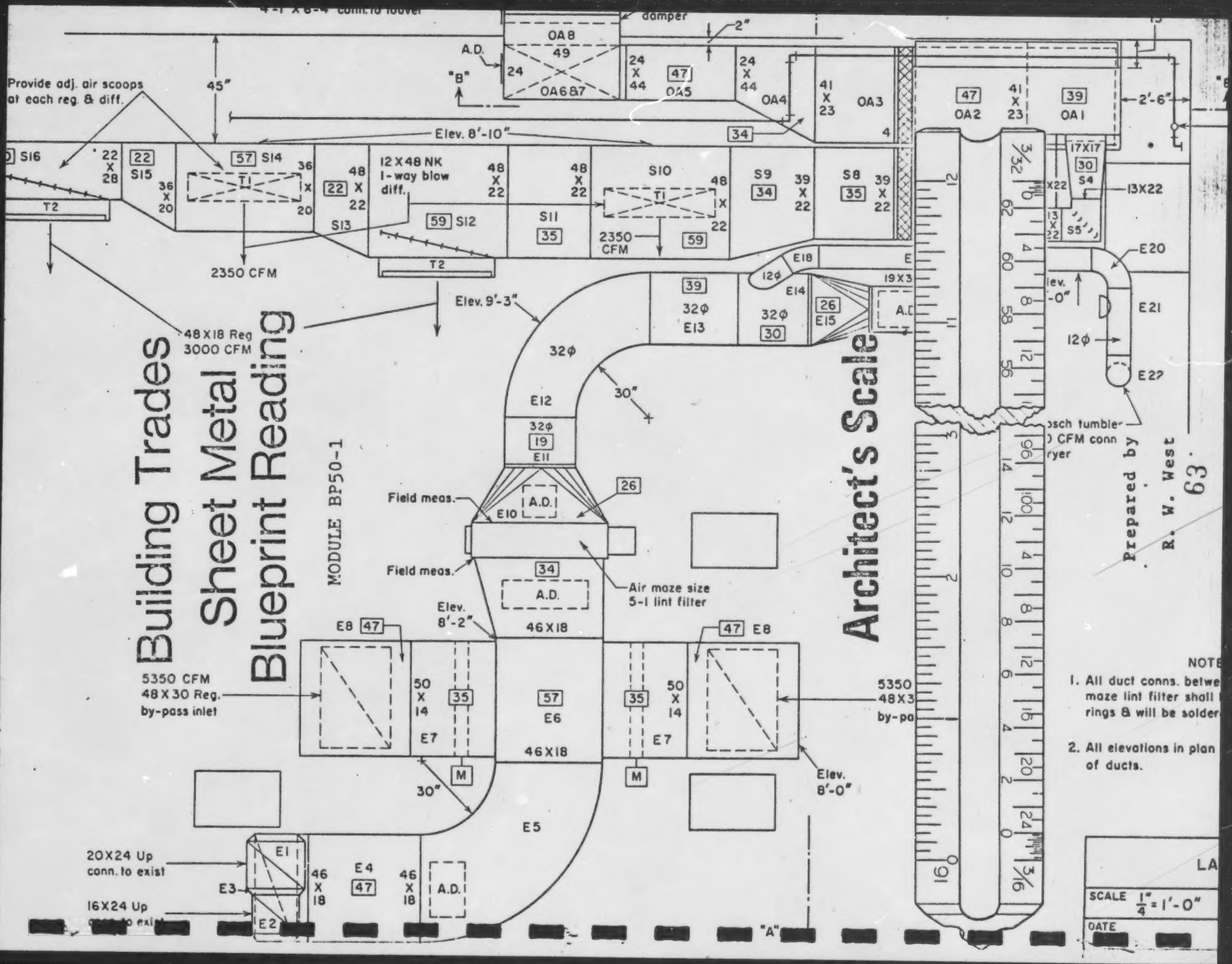
Building Trades
Sheet Metal
Blueprint Reading
MODULE BP50-1
Architect's Scale
Prepared by
R. W. West
63
damper
2"
A.D.
"B"
45"
Provide adj. air scoops at each reg. & diff.
Elev. 8'-10"
2'-6"
OA8
OA6&7
OA5
OA4
OA3
OA2
OA1
S16
S15
S14
S13
S12
S11
S10
S9
S8
S4
S5
T1
T2
12 X 48 NK 1-way blow diff.
2350 CFM
48X18 Reg 3000 CFM
Elev. 9'-3"
E10
E11
E12
E13
E14
E15
E18
E20
E21
E22
Field meas.
Air maze size 5-1 lint filter
Elev. 8'-2"
46X18
5350 CFM 48X30 Reg. by-pass inlet
5350 48X3 by-pa
Elev. 8'-0"
E1
E2
E3
E4
E5
E6
E7
E8
20X24 Up conn. to exist
16X24 Up
"A"
NOTE
1. All duct conns. betwe maze lint filter shall rings & will be solder
2. All elevations in plan of ducts.
SCALE 1" = 1'-0"
DATE

TABLE OF CONTENTS

Topic	Page
Introduction	1
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Exempting Procedure	1
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INTRODUCTION

Scale is an important word in the building industry. It would be impractical to draw plans of a building, or even major parts of a building, at actual or even half size. The drawings, therefore, are made small enough so that the blueprints can be handled easily and also large enough so that the blueprints show the necessary information clearly.

SPECIFIC OBJECTIVES

After completion of this learning package, the student will be able to:

1. Identify the different scales of the architect scale.
2. Demonstrate the ability to measure accurately a scaled drawing.

These abilities will be evidenced by scoring at least 85% on the unit post test.

EXEMPTING PROCEDURE

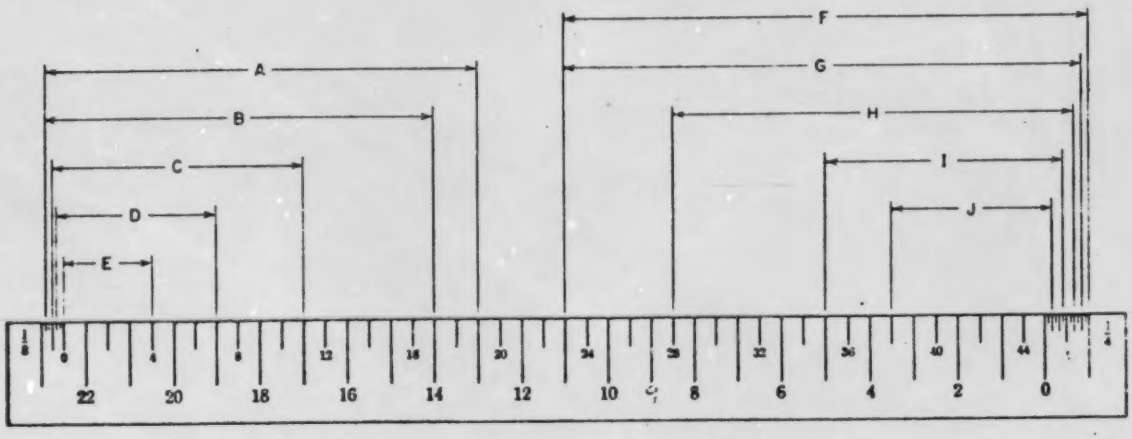
If after reading the specific objectives, you feel you can accomplish the expected outcome, of this learning package complete the following pre-test. If you score an 85 or better on this test, do not proceed, you have adequate knowledge of the architect's scale.

PRE-TEST

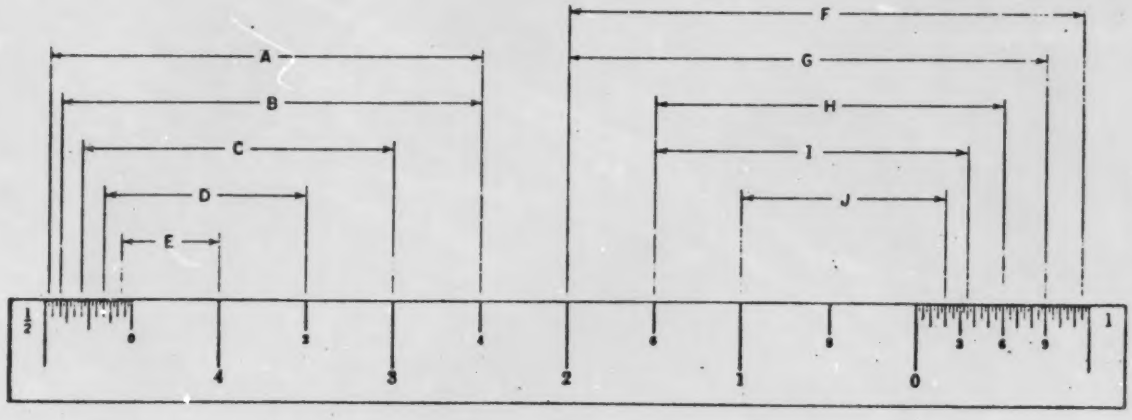
Do not write on this page.

Interpret the dimensions of the arrows shown on the following architect's scales.

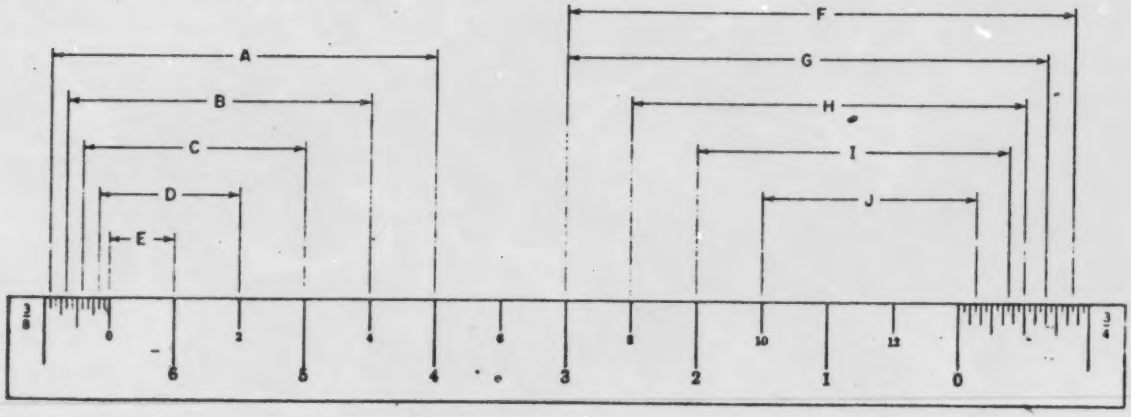
Problem 1



Problem 2



Problem 3



PRE-TEST

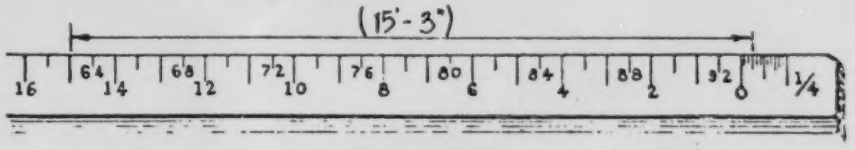
Do not write on this page.

Using an architect's scale, measure the following line lengths using the scale given at the left. Insert the dimensions in the space provided. *Note* however that any measured or scaled dimensions on a print can be only approximate. Paper shrinkage, caused by the varying moisture content of the paper, can result in a line measurement that is off as much as two inches at ¼" = 1'-0". This is why it is a poor practice to *scale* a drawing. Always use the stated dimensions.

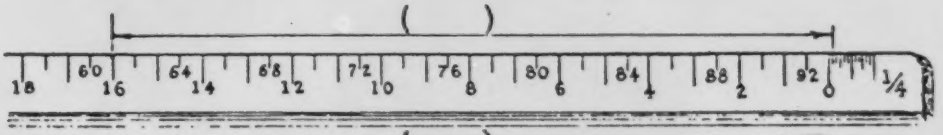
Problem 4

Example:

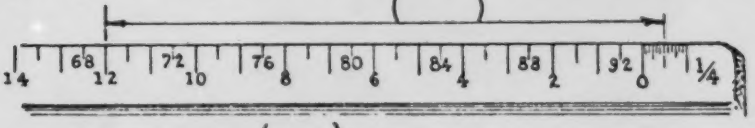
¼" = 1'-0"



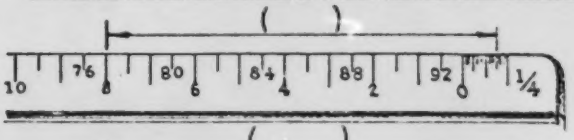
1. ¼" = 1'-0" ( )



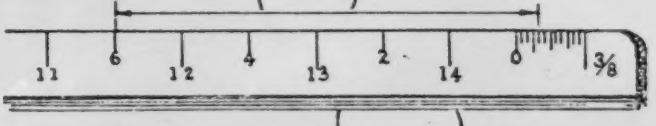
2. ¼" = 1'-0" ( )



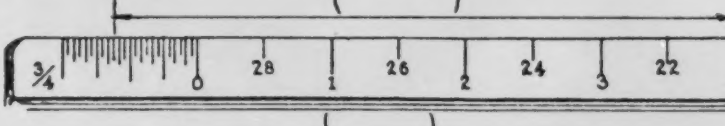
3. ¼" = 1'-0" ( )



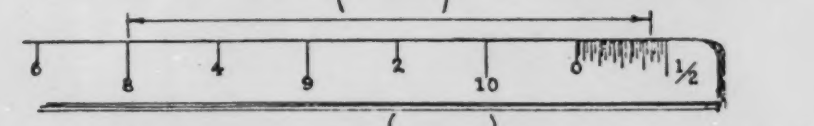
4. ⅜" = 1'-0" ( )



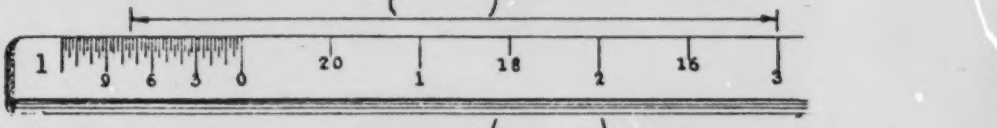
5. ¾" = 1'-0" ( )



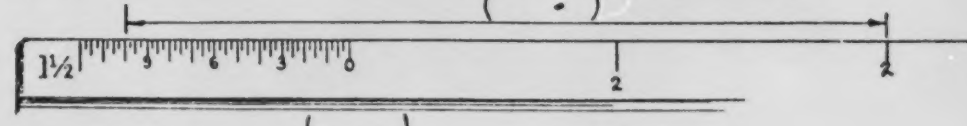
6. ½" = 1'-0" ( )



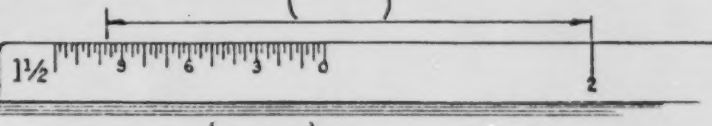
7. 1" = 1'-0" (•)



8. 1½" = 1'-0" ( )



9. 1½" = 1'-0" • ( )



10. 3" = 1'-0"

ANSWERS TO PRE-TEST

For answers to pre-test, see your Instructor.

Instructional Information

ARCHITECTURAL SCALE

The two most commonly used architect's scales in sheet metal work are the triangular and flat. The triangular scale has six ruled faces designed to measure in ten different scales. See Fig. 1. The flat architect's scale has beveled edges which have only four ruled faces. See Fig. 2. There is no difference in the scales or in their application. With the triangular scale, however, there are more scales to choose from.

The most common design for this type of scale is the triangular shape in figure 1. One edge of the scale is graduated as a standard 12" ruler, in units of 1/16". The other edges of the scale are calibrated to standard scales that are commonly used in architectural work: 1/8" = 1'0"; 3/8" = 1'0"; 1" = 1'0"; 3/32" = 1'0"; 1 1/2" = 1'0"; 12" = 1'0"; 1/4" = 1'0"; 3/4" = 1'0"; 1/2" = 1'0"; 3/16" = 1'0"; 3" = 1'0".

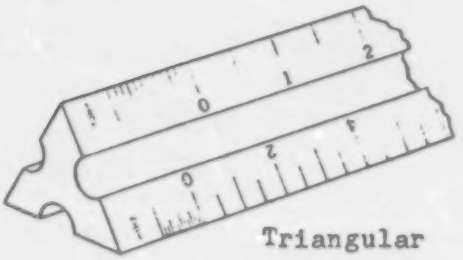


Fig. 1 Architect's Scale

The flat four-bevel rule, figure 2, has eight scales at reduced ratios to the full scale: 1/8", 1/4", 1", 3/8", 3/4", 1 1/2", and 3" = 1'-0".

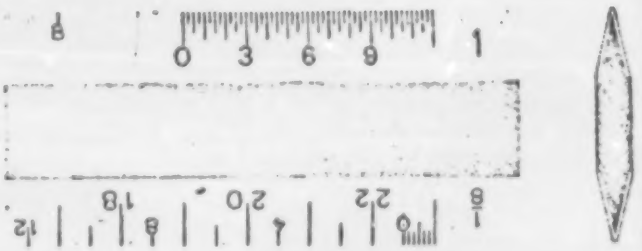


Fig. 2 Flat Architect's Scale

The architect's scale is laid out so that each edge contains two different scales. In each case, the two scales which are matched together contain a common denominator. This is necessary to avoid the confusion which would result from combining two scales whose units of length are not multiples of each other. For example, in figure 3 , the scales which jointly occupy the single edge are the 1/4" = 1' 0" scale and the 1/8" = 1' 0" scale. The 1/8" scale is marked off with short lines, each one representing a foot. This scale is read from left to right. The 1/4" scale is marked off with longer lines, each one representing a foot drawn to this scale, and is read from right to left.

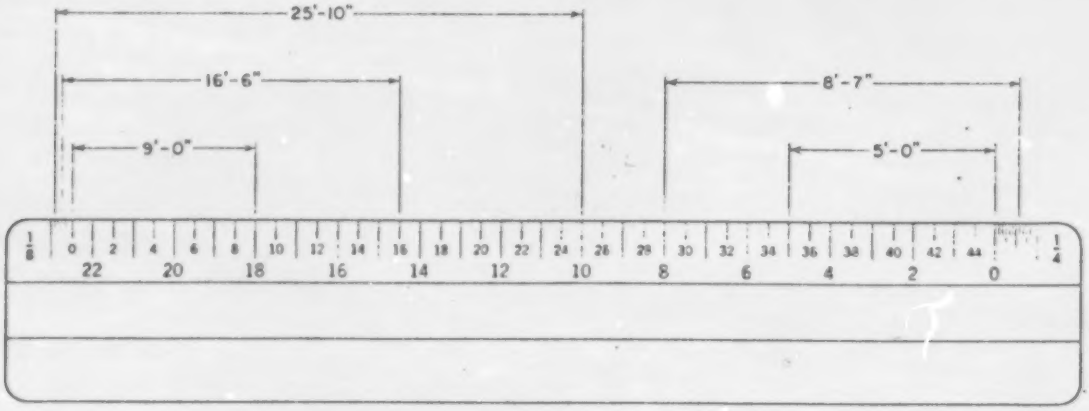
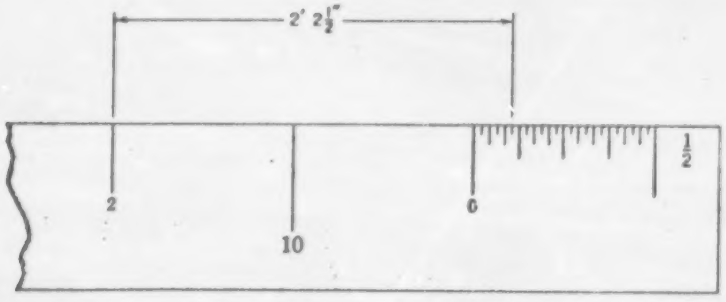


Figure 3, *An Architect's Scale*

Note that these two scales complement each other and no confusion results in reading the graduations of either scale. Each long line represents one foot on the 1/4" scale or two feet on the 1/8" scale. Each short line represents one foot on the 1/8" scale and one-half foot or six inches on the 1/4" scale.

At each end of the scale there is a short section with finely calibrated lines. The total length of this short scale is 1/8", 1/4", 3/8", 1/2", etc., depending on which end is used. The fine graduations of these scales represent inches and are used to lay out accurately the scale reductions of those dimensions which include inches. Several typical dimensions are shown in the illustration.

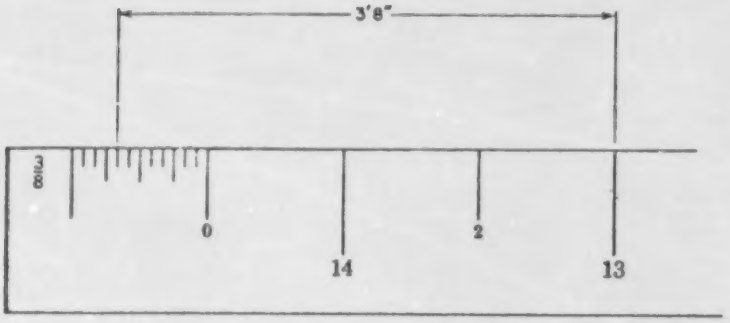


EXAMPLE 1: Read 2' 2 1/2" using 1/2" = 1'0"

a. From the 0 mark, move to the left to 2'

b. From the 0 mark, move to the right 5 divisions or 2 1/2"

Note: *The twelve larger spaces on the right end represent inches. The smaller spaces represent half inches. Thus, 2 1/2" would be represented by 2 large divisions plus one small division, or 5 divisions in all.*

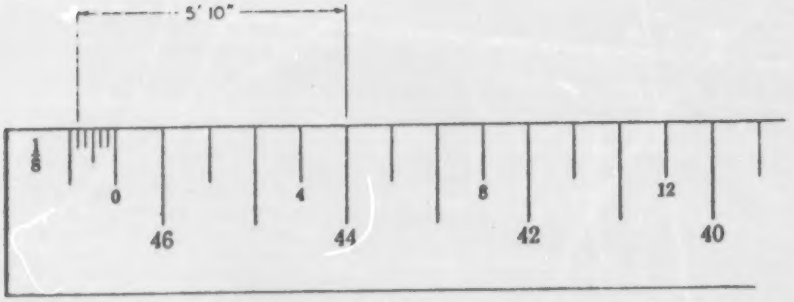


EXAMPLE 2: Read 3' 8" using 3/8" = 1' 0"

a. From the 0 mark, move to the right to 3 ft. (13 on scale).

b. From the 0 mark, move to the left 8 divisions or 8"

Note: *The foot on the left end is divided into twelve equal spaces, each representing 1".*



EXAMPLE 3: Read 5' 10" using 1/8" = 1' 0".

a. From the 0 mark, move to the right to 5 ft. (44 on scale).

b. From the 0 mark, move to the left 5 divisions or 10".

Note: *The foot on the left end is divided into six equal spaces, each representing 2".*

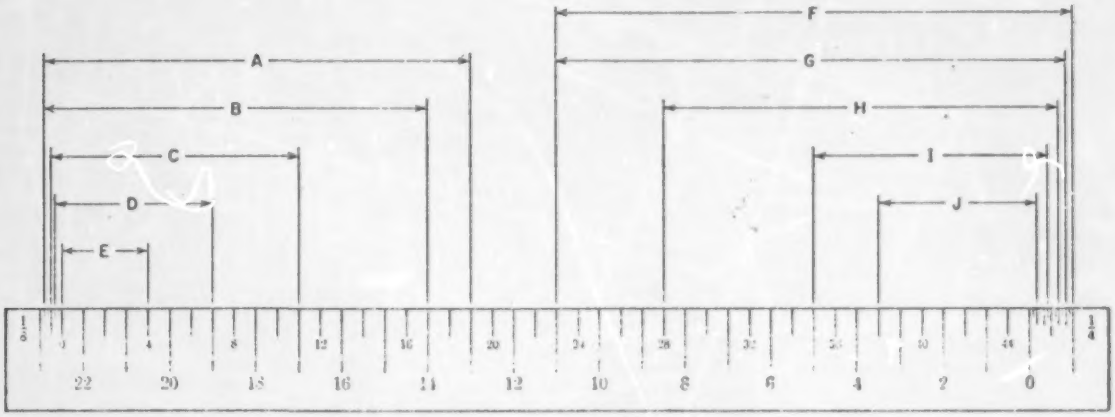
POST TEST

Now that you have completed this package, it is time to evaluate what you have learned. You are expected to achieve an 85 per cent or better.

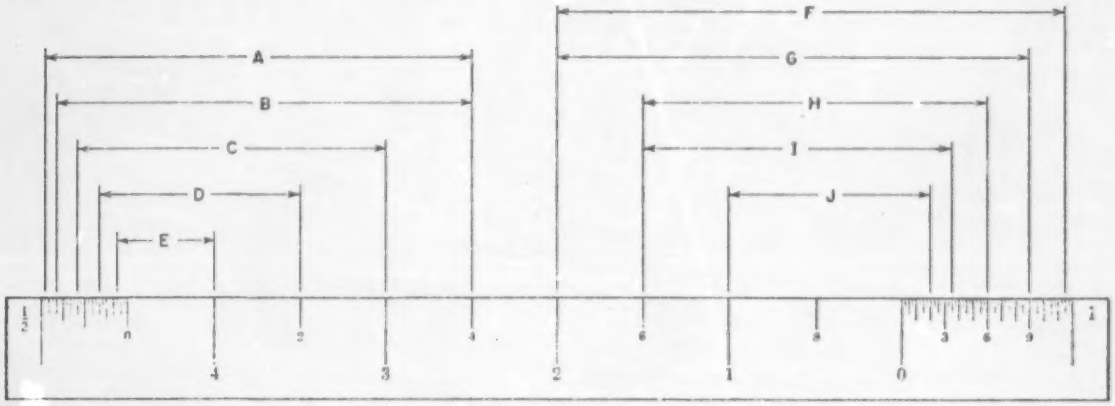
Do not write on this page.

Interpret the dimensions of the arrows shown on the following architect's scales.

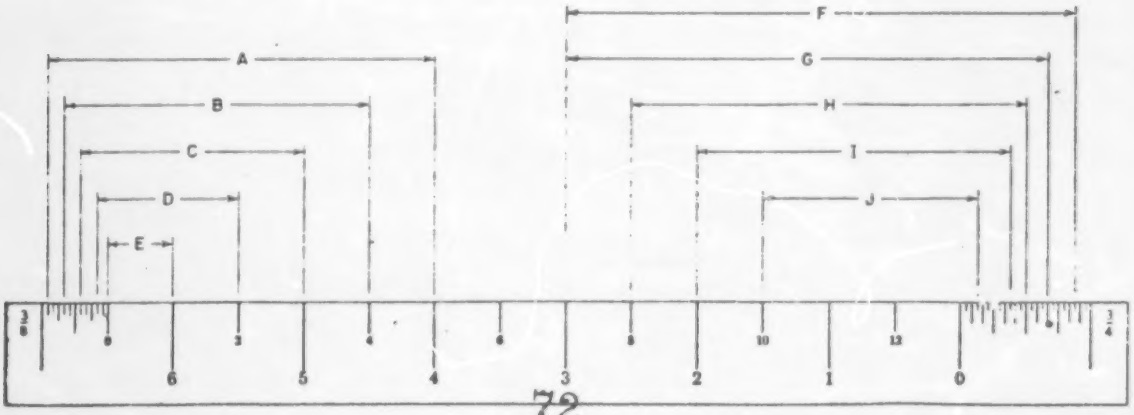
Problem 1



Problem 2



Problem 3



POST TEST

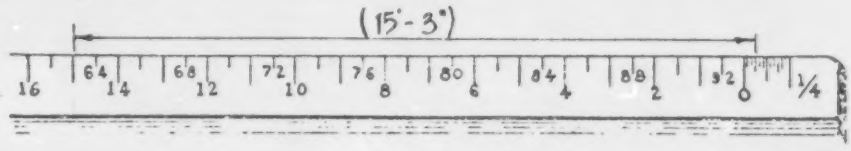
Do not write on this page.

Using an architect's scale, measure the following line lengths using the scale given at the left. Insert the dimensions in the space provided. *Note* however that any measured or scaled dimensions on a print can be only approximate. Paper shrinkage, caused by the varying moisture content of the paper, can result in a line measurement that is off as much as two inches at ¼" = 1'-0". This is why it is a poor practice to *scale* a drawing. Always use the stated dimensions.

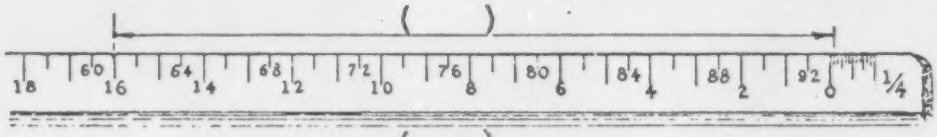
Problem 4

Example:

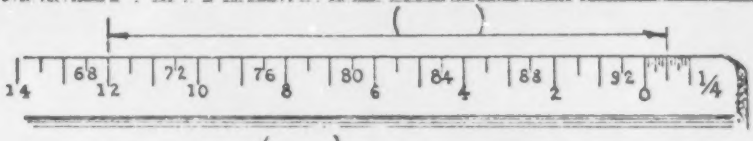
¼" = 1'-0"



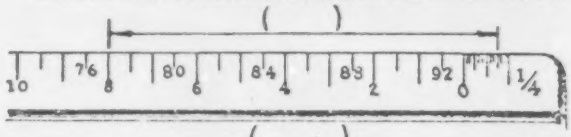
1. ¼" = 1'-0" ( )



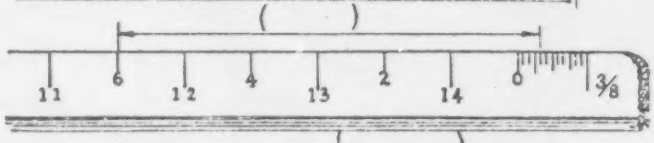
2. ¼" = 1'-0" ( )



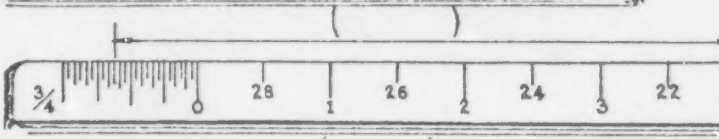
3. ¼" = 1'-0" ( )



4. ⅜" = 1'-0" ( )



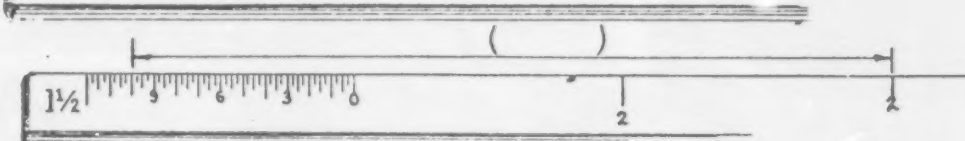
5. ¾" = 1'-0" ( )



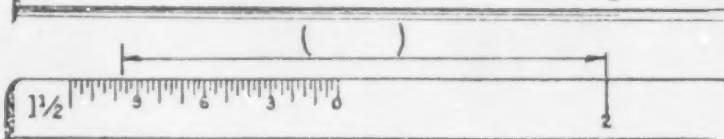
6. ½" = 1'-0" ( )

7. 1" = 1'-0" ( )

8. 1½" = 1'-0" ( )



9. 1½" = 1'-0" ( )



10. 3" = 1'-0"

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ANSWERS TO POST-TEST

For answers to post-test, see your Instructor.

Answer Key For Pre-Test And Post Test

Architect's Scale

Problem 1	Problem 2	Problem 3
A = 19'10"	A = 4'11½"	A = 5'11"
B = 17'10"	B = 4'10"	B = 4'8"
C = 11'6"	C = 3'7"	C = 3'5"
D = 7'4"	D = 2'4"	D = 2'2"
E = 4'0"	E = 1'1½"	E = 1'0"
F = 12'0"	F = 2'11½"	F = 3'10½"
G = 11'10"	G = 2'9"	G = 3'8"
H = 9'2"	H = 2'0"	H = 3'0"
I = 5'5"	I = 1'9½"	I = 2'4½"
J = 3'8"	J = 1'2"	J = 1'7½"

Problem 4

1. 16'1"
2. 12'6"
3. 8'9"
4. 6'4"
5. 4'7½"
6. 5'10"
7. 3'7½"
8. 2'10"
9. 1'9 3/4"
10. 7 5/8"

Deduct 2.5 for each wrong answer.

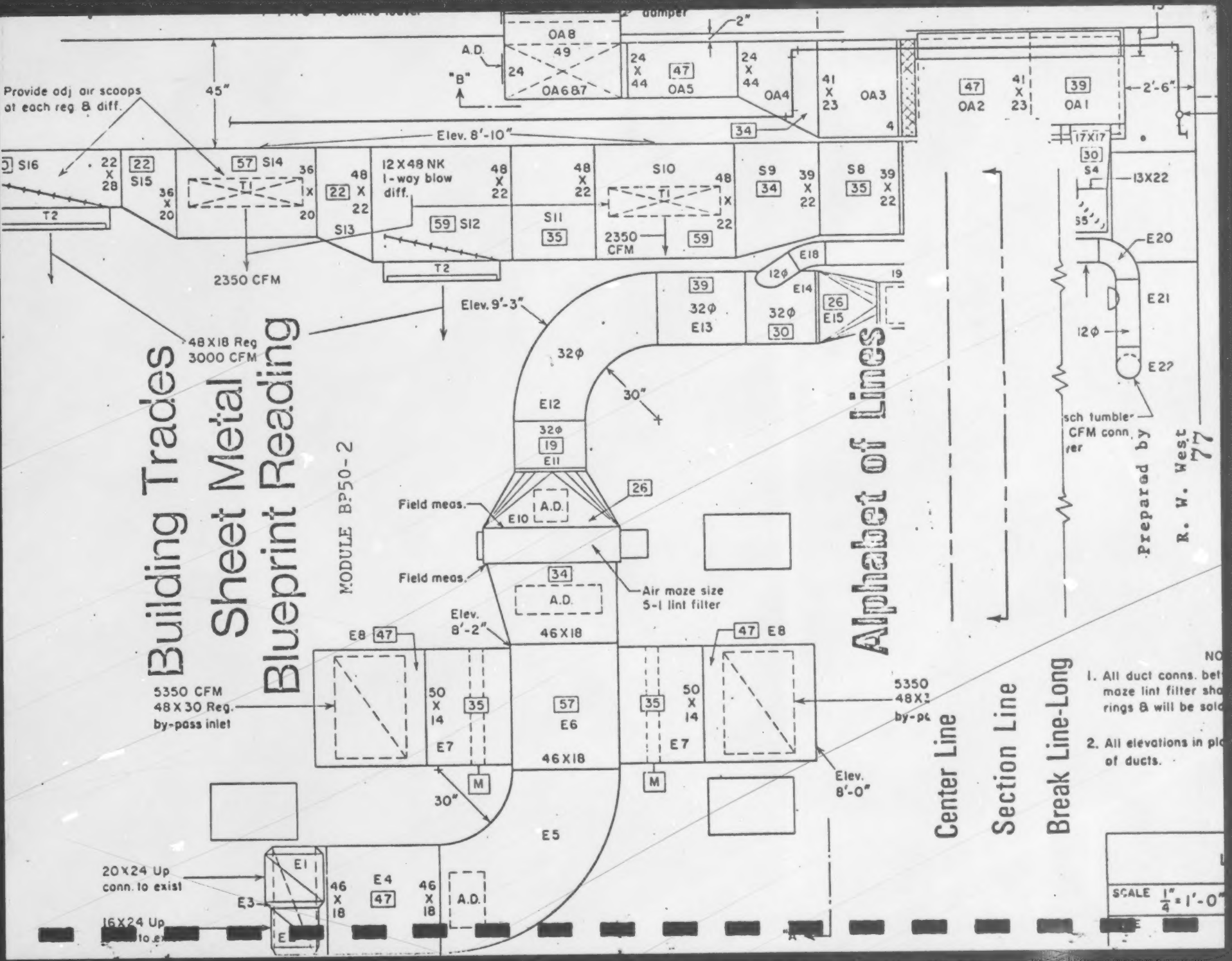

Building Trades
Sheet Metal
Blueprint Reading
MODULE BP50-2
Alphabet of Lines
Center Line
Section Line
Break Line-Long
Provide adj air scoops at each reg & diff.
45"
Elev. 8'-10"
OA8
OA6&7
OA5
OA4
OA3
OA2
OA1
A.D.
"B"
2"
2'-6"
17X17
S16
S15
S14
S13
S12
S11
S10
S9
S8
S4
12X48 NK 1-way blow diff.
2350 CFM
T1
T2
13X22
E20
E21
E22
E18
E14
E15
E13
E12
E11
E10
E8
E7
E6
E5
E4
E3
E1
32φ
12φ
30"
Elev. 9'-3"
48X18 Reg 3000 CFM
Field meas.
A.D.
Air maze size 5-1 lint filter
46X18
Elev. 8'-2"
5350 CFM 48X30 Reg. by-pass inlet
5350 48X3 by-pa
Elev. 8'-0"
20X24 Up conn. to exist
16X24 Up
46 X 18
Prepared by
R. W. West
SCALE 1/4" = 1'-0"
1. All duct conns. bet maze lint filter sha rings & will be sold
2. All elevations in pl of ducts.

TABLE OF CONTENTS

Topic	Page
Introduction	1
Specific Objectives	1
Exempting Procedure	1
Pre-Test	2 & 3
Answers to Pre-Test	4
Instructional Sheets	5, 6, 7, 9
Post Test	9 & 10
Answers to Post Test	11

INTRODUCTION

Blueprints are not just mysterious collections of lines on pieces of white or blue or brown paper designed to confuse Sheet Metal Workers. Neither are they a foreign language that can be learned only through long years of sweat and struggle. This learning package will deal with the Alphabet of lines, which is a set of conventional symbols covering all the lines needed to depict an object as to size and shape.

SPECIFIC OBJECTIVE

After completion of this learning package, the student will be able to:

1. Identify the ten types of lines included in the alphabet of lines.

This ability will be evidenced by scoring at least 80% on the unit post test.

EXEMPTING PROCEDURE

If after reaching the specific objective, you feel you can accomplish the expected outcome, of this learning package, complete the following pre-test. If you score an 80% or better on this test, do not proceed, you have adequate knowledge of the alphabet of lines.

IDENTIFY EACH OF THE LINES ON PAGE 3

Do not write on this page.

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

(6) _____

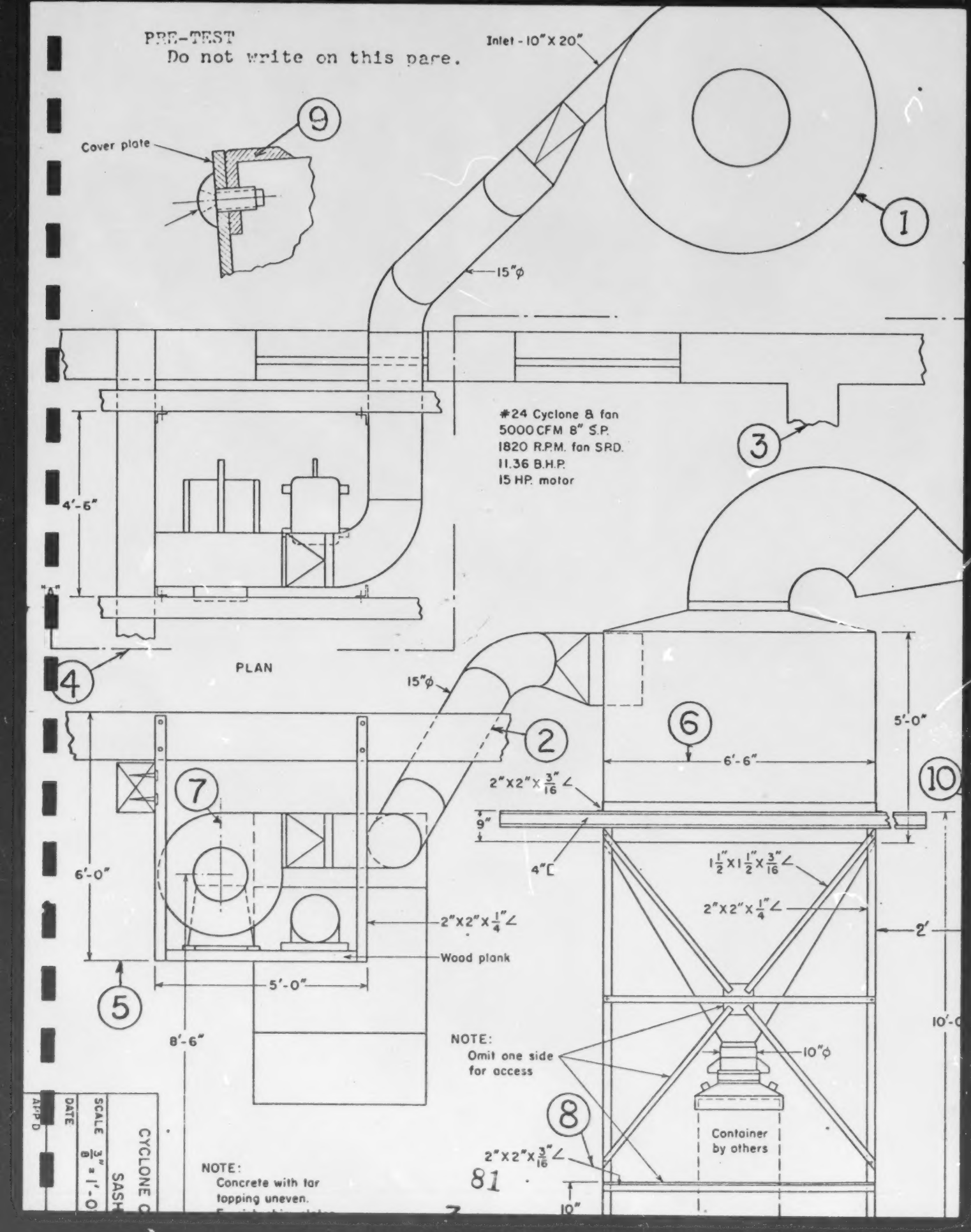
(7) _____

(8) _____

(9) _____

(10) _____

PRE-TEST
Do not write on this page.



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ANSWERS TO PRE-TEST

For answers to pre-test, see your Instructor.

Alphabet of Lines

Object Line

Object lines show the main outline of the structure including exterior walls, interior partitions, trunk lines, etc. These lines should be the outstanding lines on the drawing. See ② Fig. 1

Hidden Line

Hidden lines are short dashes, about 1/8" long, used to show lines, or objects, that are not visible from that surface. Outlines of beams etc. are sometimes also shown by dashed lines, but with longer dashes, about 1/4" to 3/8" long. See ③ Fig. 1

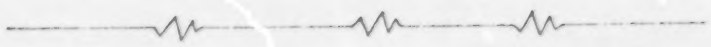
Extension Line

Extension lines, sometimes called witness lines are fine, unbroken lines of sharp intensity. They extend, but do not touch, the object lines and permit dimension lines to be drawn between them. See ④ Fig. 1

Dimension Line

Dimension lines are similar to extension lines, but are terminated at each end with arrowheads. They are used to designate dimensions. A degree dimension for an angle is treated in the same manner, except that the dimension line is an arc, drawn from the angle apex. When an object is only drawn in part, or out-of-scale for space reasons, the dimension line remains solid; but the abbreviation NTS (not to scale), is placed just below the dimension figure and line. See ⑤ & ⑤a Fig. 1

Break Line



Break lines are used when an area cannot or should not be drawn entirely. A break line for a rectangular duct is indicated by an angular line drawn between the duct lines, broken by two free-hand zig-zags. See ⑥ Fig. 1. A break line for a building construction material is similar to ⑥ but is drawn with one zig-zag. See ⑥a. A break line for round objects is indicated by a symmetrical, high and low curve that intersects and joins at the centerline. See ⑦

Center Line

The centerline is a sharp, clean, broken line composed of alternate long and short dashes, spaced evenly, about 1/16" apart. The long dashes are approximately 3/4" to 1" in length, depending on the scale-size of the drawing, while the short dashes are about 1/8" in length. Typical applications are to indicate centers for: round ducts, fans, casings, dampers, beams, columns, openings, light, etc. See ⑧ Fig. 1

Phantom Line

Phantom line is a sharp, fine, broken line of one long and two short dashes spaced evenly, about 1/16" apart. Generally indicate something about manufacturing other than the part itself. Typical uses, as shown in ⑨ Fig. 1, are the buildingline and line-of-beam in the section view.

Leader

Leader Line is a sharp, fine line which indicates the part of an object referred to by a note. A straight line is used when the line may be easily identified, although a snakelike, curved line is perferred in a complicated drawing or one having many straight lines. These leader lines end with arrowheads at the designated object, see ⑩ Fig. 1.

Section Line

Cutting plane lines or section lines. When specific objects on a shop drawing cannot impart complete information in the plan view, it becomes necessary to draw auxiliary views or sections. A section is a partial, vertical view (elevation) of a particular portion of the plan, and is shown by cutting-plane lines, arrows and letters. Cutting-planes are selected and located so that the desired information may be indicated clearly and precisely. Arrows show the direction of view; and letters, the same for plan and section, are used for identification. Two arrows and letters are needed to indicate the extent of the cut view; see (11) Fig. 1

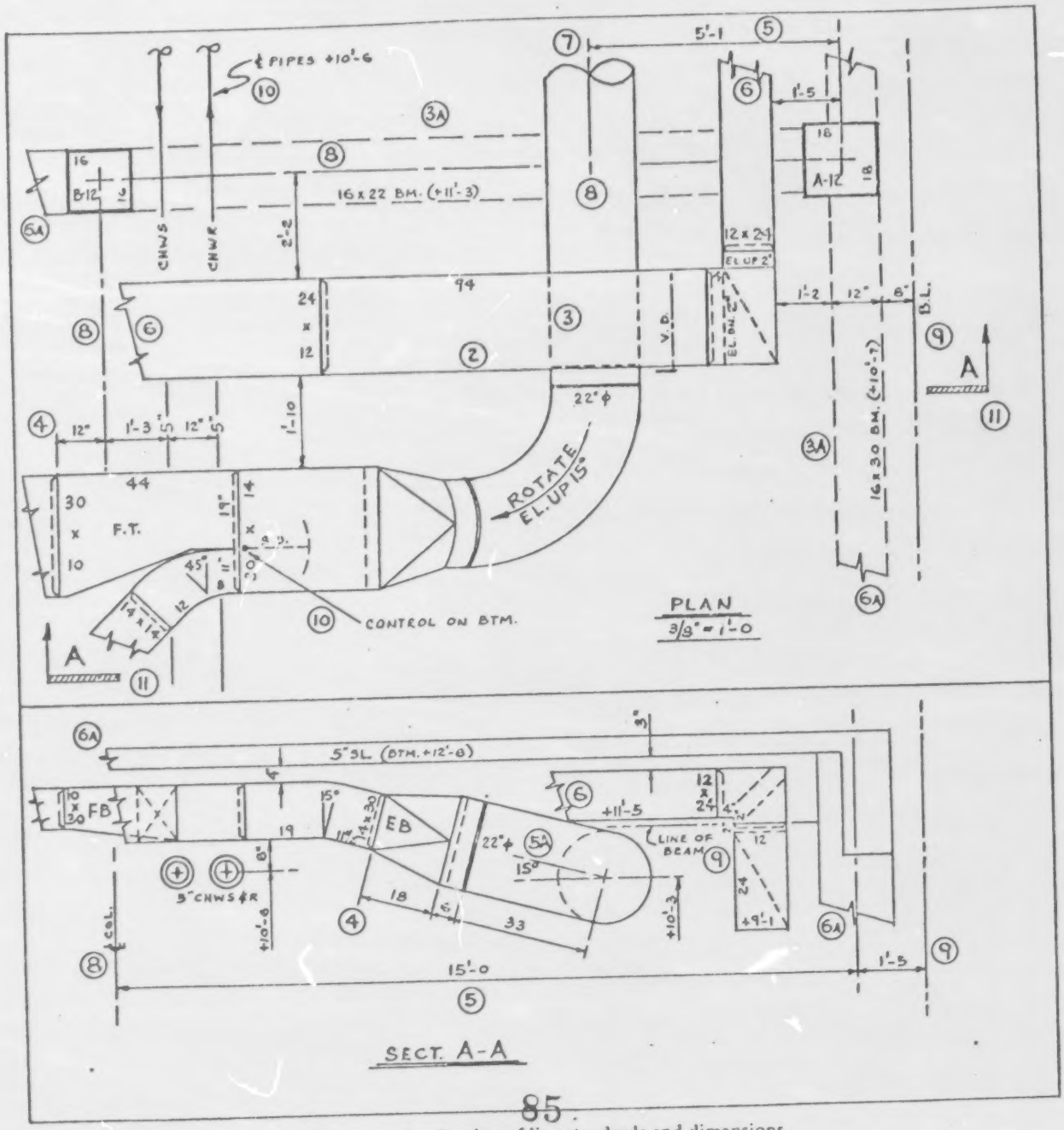


FIG. 1 Application of line standards and dimensions.

Cross hatch lines indicate visible surfaces of imaginary surfaces (surfaces of imaginary cutting planes). Fig. 2 & 3 are typical examples of cross hatch lines.

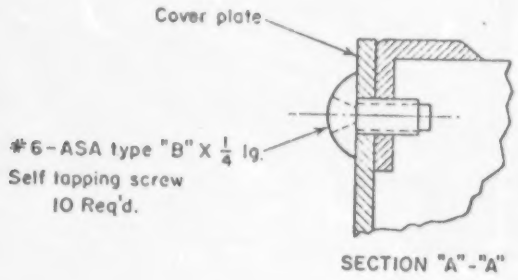


Fig. 2

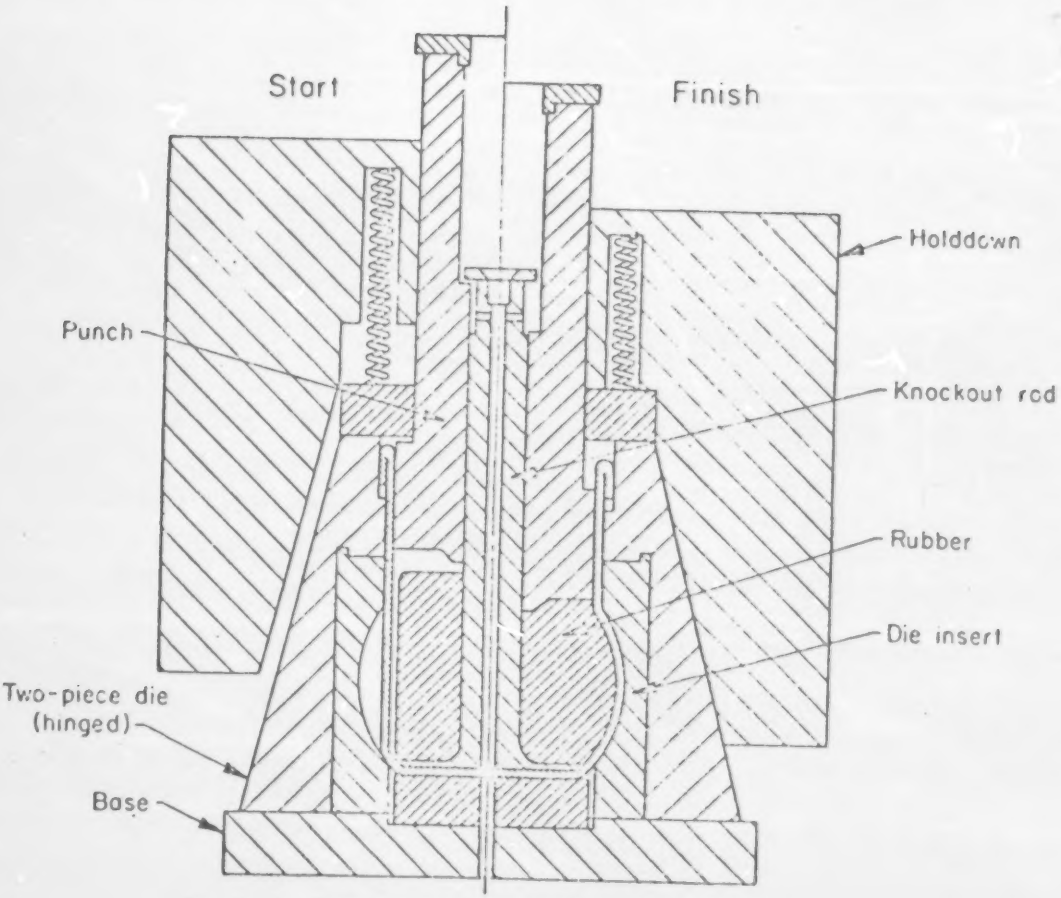


Fig. 3 — Bulging a percolator shell with a rubber punch.

POST-TEST

Now that you have completed this package, it is time to evaluate what you have learned. You are expected to achieve an 80 per cent or better.

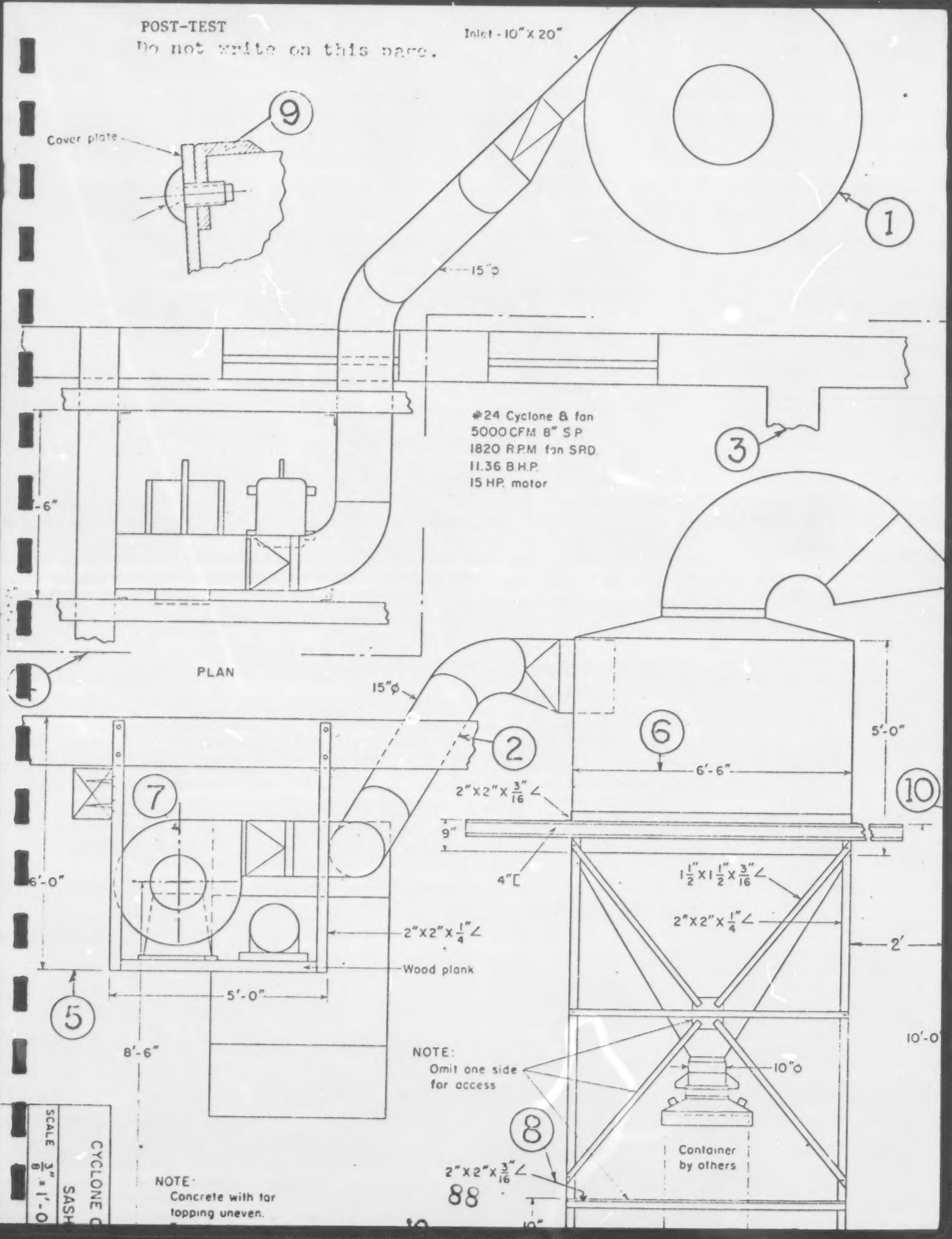
Do not write on this page.

IDENTIFY EACH OF THE LINES ON PAGE 10

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

POST-TEST

Do not write on this page.



ANSWERS TO POST-TEST

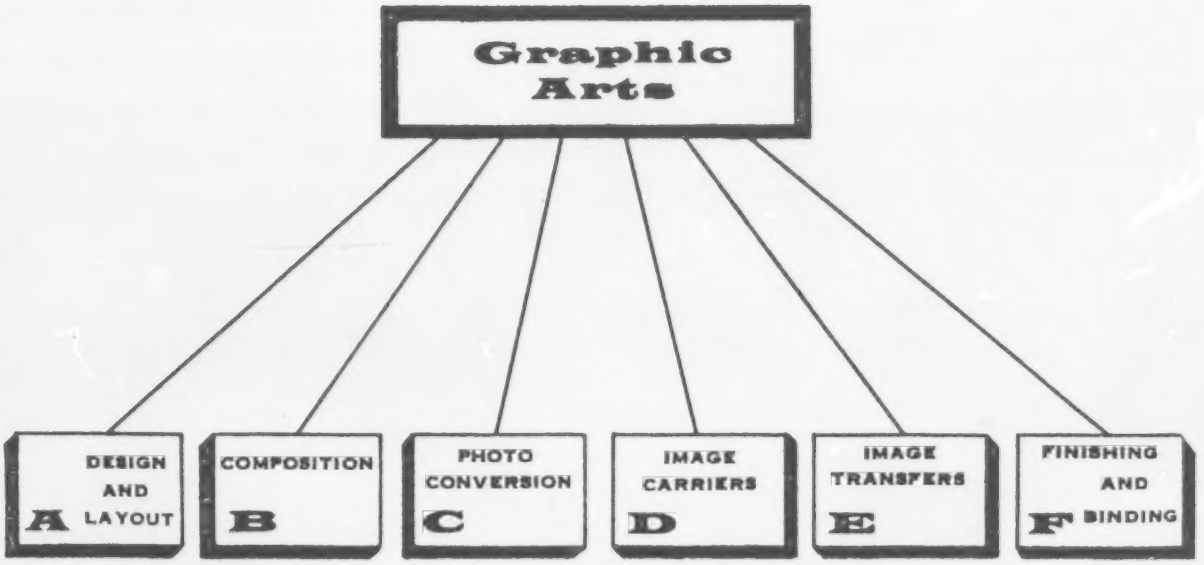
For answers to post-test, see your Instructor.

IMAGE TRANSFERS

E

PRESSURE CHECKS

1250 Multilith



Regional Technical - Vocational Center

PRESQUE ISLE HIGH SCHOOL PRESQUE ISLE, MAINE 04769

PREPARED BY

BRIAN ROSS

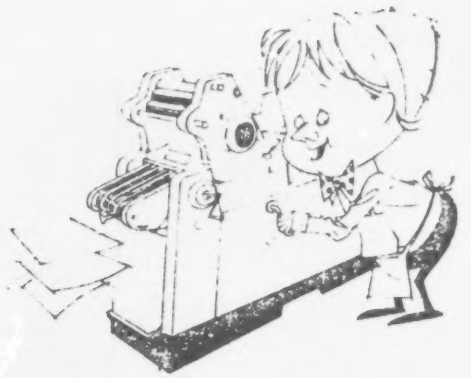
GRAPHIC ARTS INSTRUCTOR

INTRODUCTION

In all the graphic arts, with only a few exceptions, the equipment which produces the salable sheets is the focal point of a particular process. This is true even though the printed or lithographed sheets are very often processed in some finishing steps, and even though the finishing may be an expensive procedure during which the appearance of the lithographed sheet may be completely changed in order to attain its final product form. All preparatory steps, while they are designed to utilize as much as possible the inherent advantages of the lithographic process, are determined nevertheless largely by the capacity of the pressroom equipment. It is true that the choice of press may depend on the demands of the finishing processes. However, once this choice has been made, all further activity is aimed at deriving maximum output from the lithographic press at the least possible cost.

The printing unit is the heart of the lithographic press. Therefore, it is necessary that this unit be kept in perfect running condition. This module is designed to help you acquire the necessary skills in this phase of press operation titled: "Pressure Checks of the 1250 Multilith."

This is a competency based module and therefor, it is your learning ability that is being evaluated. The real test of a competency based module's effectiveness ulitmately comes when you try to perform the learning experiences from it. Therefore, you may wish to inform your instructor of any problems you may have had completing this module.



THE MULITLITH PROCESS

The Mulitlith Offset Duplicating Process is based on the principle that a grease substance and water will not mix. An image placed on the duplicating plate by means of a grease or "ink-attractive" substance will accept ink from the ink rollers of the duplicator but will reject moisture from the dampening or moisture roller. Conversely, ink will not adhere to the clear, non-image area of the plate because of moisture deposited by the form roller of the dampening system.

When the plate is placed on the duplicator, this process is started by the application of an initial moistening solution to protect the clear areas of the plate from ink until the action can be maintained by the dampening form roller of the duplicator. Adjustable controls on the dampening and inking units serve to "balance" the ratio of moisture-to-ink during the run and provided duplicated copy which is clear, well-inked and free from background tone.

The manner in which copy is produced through the Multilith Duplicating Process is illustrated in Figure 10.

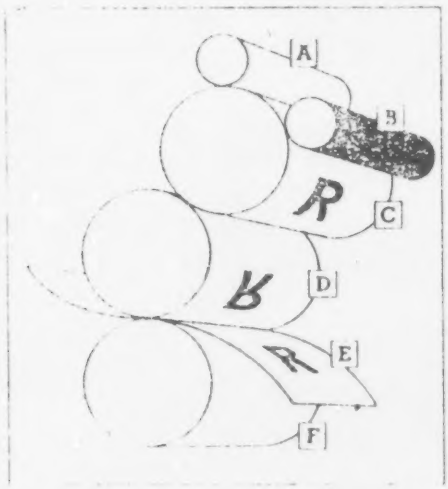


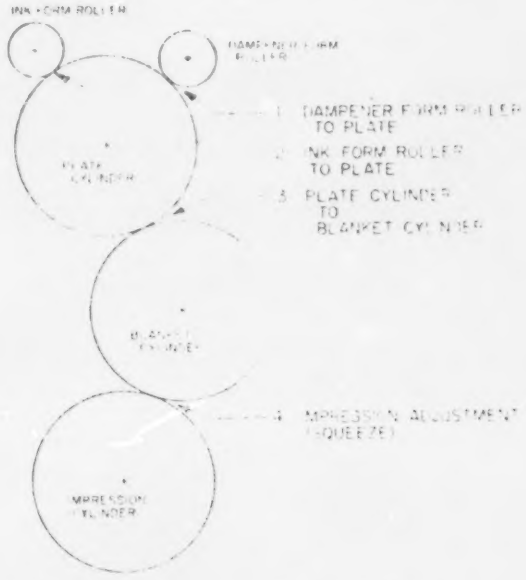
Fig. 10 Principle of Multilith Offset Process

The inked image (R) on the plate (C) is moistened and inked once each revolution of the cylinder by the moisture roller (A) and the ink roller (B).

The rubber-covered blanket cylinder (D) rotates in contact with the plate (C), transferring the image to the blanket.

The "Impression" cylinder (F) rotates against the blanket cylinder (D) while paper (E) is fed between them. In this manner, the image on the blanket is transferred to the paper.

SEQUENCE OF PRESSURE CHECKS


INK FORM ROLLER
DAMPENER FORM ROLLER
1 DAMPENER FORM ROLLER TO PLATE
2 INK FORM ROLLER TO PLATE
3 PLATE CYLINDER TO BLANKET CYLINDER
4 IMPRESSION ADJUSTMENT (SQUEEZE)

Sequence and Location of Pressure Checks

About This Module

OBJECTIVES

TERMINAL OBJECTIVE: While working in an actual shop/school situation, perform the daily pressure checks of the Multilith 1250. (Learning experience V).

Enabling Objectives:

1. Utilizing your present knowledge point out the different rollers in the dampening and inking system to your instructor and explain the function of each system.
   plain the function of each system. (Learning Experience I).
2. Utilizing your present knowledge perform the pressure checks of the dampening and inking systems of the 1250 Multilith with your instructor in attendance. (Learning Experience II).
3. Utilizing your present knowledge point out the plate, blanket and impression cylinders to your instructor and describe the function of each. (Learning Experience III).
4. Utilizing your present knowledge perform the pressure checks of the plate, blanket and impression cylinders with your instructor in attendance. (Learning Experience IV).

Prerequisites

To complete this module, you must have competency in the Pre-Press Operations and Press Operations. If you do not already have this competency, meet with your instructor to determine what method you will use to gain this skill.

Resources

A list of the outside resources which supplement those contained within the module follows.

1. Reference Manual "Multilith Offset model 1250 with Single Lever Control".
2. "Trouble Shooter for 1250 Multi" by Joseph Sellar.
3. "Photo Offset Fundamentals" by John E. Cogoli.
4. "Graphic Communications" by Richard J. Broekhuizen.
5. "The Lithographers Manual" fou. th edition published by: "The Graphic Arts Technical Foundation, Inc."

Check with your instructor (1) to determine the availability and the location of these resources, (2) to locate additional references in your occupational specialty, and (3) to get assistance in setting up activities with peers or observstions of skiller teachers, if necessary. Your instructor may also be contacted if you have any difficulty with directions, or in assessing your progress at any time.

Learning Experience I

Required
An instructor to evaluate your performance sheet at the end of the learning experience.

Learning Experience II

Required
An instructor to assess your competency in performing the required pressure checks.
An actual shop/school situation in which you can actually perform the pressure checks.

Learning Experience III

Required
An instructor to evaluate your performance sheet at the end of the learning experience.

Learning Experience IV

Required
An instructor to assess your competency in performing the required pressure checks.
An actual shop/school situation in which you can perform the pressure checks.

Learning Experience V

Final Experience
An instructor to assess your competency in this phase of press operation.

Learning Experience I

Utilizing your present knowledge point out the different rollers in the dampening and inking system to your instructor and explain the function of each system.

You will be reading the information on page 5 reguarding the purpose of the dampening system.

You will be reading the information on page 6 pertaining to the purpose of the inking system.

You may wish to discuss with other students the function and purpose of the dampening and inking systems.

You will be evaluating your competency by completing the self-check sheet on page 7.

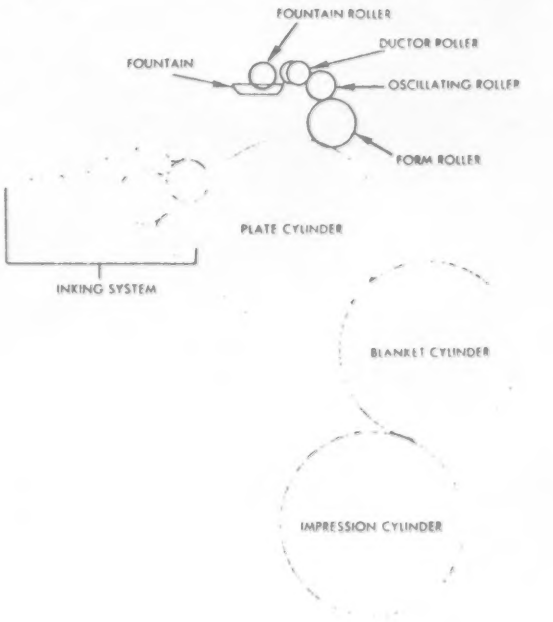
Dampening System

PURPOSE

Of all the printing processes only lithography requires a plate-treating system in conjunction with inking. It is easy to understand the reason for this if one keeps in mind the peculiar nature of the lithographic plate. It is planographic, meaning, as we know, that the image areas are in the same plane as the non-image areas. The image areas are hydrophobic, which means they are not receptive to water but resist greasy ink. It must, however, be understood at the outset that both image and non-image areas must be continually treated during running to retain their individual properties.

It is true of course that the ink receptive properties of the lithographic plate are quite difficult to destroy - if the plate is properly made. However, the water receptive characteristics of the non-image areas can be destroyed within a matter of seconds if, during running the dampening rollers are kept from contacting the plate. A well made plate, running on a properly operated press, will print a strong sharp image while retaining perfectly clean non-printing areas for extremely long runs. This is true even in the small clear spaces between dots of a 300 - line half-tone plate.

The dampening system of the lithographic offset press consists of three basic components: (1) the water fountain (2) a vibrating distributor roller; and (3) the form dampeners. The water fountain, generally called pan, is a reservoir for the dampening solution which is applied to the plate. In it is a roller that may be either of brass, chrome plated, or cloth covered. In rotating, this roller lifts some solution out of the pan. Another roller, the ductor, rest intermittenly against the the water-pan roller. The ductor roller is generally covered with a fairly thick, absorbent cloth, known as molleton; it soaks up solution from the water roller. The ductor oscillates between the pan roller and a metal distributing roller. When the ductor roller contacts the metal distributor roller, some of the surplus water is transferred. The distributor roller, in turn, spreads this solution evenly over the entire surface of the form dampening roller with which it is in constant contact. These are also covered. The dampening rollers deposit solution in the non-printing areas of the plate just before the plate passes the inking form rollers.



Relationship of dampening system to press

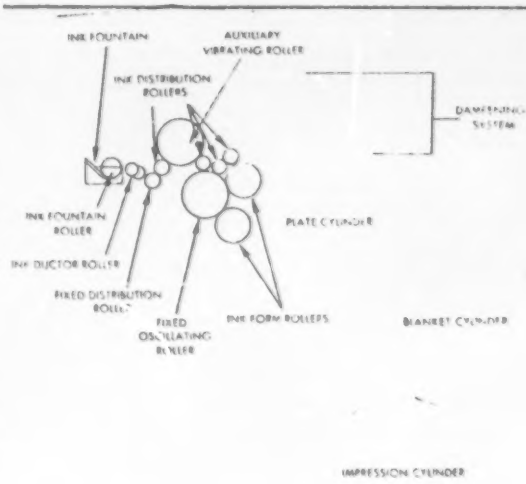
Inking System

PURPOSE

The lithographic process makes more demands on its inking system than any of the other printing process. Some people have said that the size of roller train and the number of rollers are due only to traditional beliefs. The fact is, however, that all attempts to simplify the system have so far failed. This is still true, even though the working and running properties of today's inks are vastly improved over those which existed when the lithographic offset press entered the printing field.

Ordinarily, one might think of an inking mechanism as a device whose function is to deposit ink on the printing image. This is true in all printing processes. But on a lithographic press the inking mechanism must perform other functions too, and with far greater efficiency than is demanded of their inking units by the intaglio or relief process. The lithographic image carrier is planographic; its image area is on the same plane as its non-image area. The form rollers of the ink train, therefore, contact both image and non-image area at the same time. This condition imposes in itself a severe demand on the image-inking operation.

The Five Main Functions of the Inking System. The inking system on a lithographic offset press must perform the following functions: (1) It must "work" the ink by conditioning it from what is essentially a plastic state to that of a semi-liquid; (2) It must distribute a small, comparatively thick band of ink on the ductor roller to an even, thin film around all the form rollers; (3) It must deposit a uniformly even, thin film of ink on the image; (4) It must pick up fountain solution from the lithographic plate, emulsify some of this into the ink, and evaporate the rest into the atmosphere; (5) It should pick up from the lithographic plate any particles of foreign matter and hold them until the entire mechanism is cleaned.



Relationship of inking system to press.

The following items check your comprehension of the material in the information sheet, Dampening and Inking System -- Purpose.

Self-Check

I DAMPENING AND INKING SYSTEM PURPOSE

DIRECTIONS: Complete the following exercise by filling in the proper word (or words) in the blank spaces provided for at the bottom of the exercise.

1. The--------system delivers fountain solution to the non-image areas of the printing plate.

2. There are---------form rollers in the inking system of the 1250 Mulitlith Offset Duplicator.

3. Fountain solution is picked-up from the fountain or water pan by the water fountain roller; the solution is then transferred to the---------roller.

4. The---------system is responsible for picking-up any foreign matter from the printing plate.

5. The---------system must pick-up excess fountain solution from the printing plate and allow it to evaporate.

1. _____ 2. _____ 3. _____

4. _____ 5. _____

DIRECTIONS: Listed below are a number of statements. Some are true and some are false. If the statement is true encircle the "T" at the left of the statement. If the statement is false, encircle the "F".

1. T. F. The inking system on the 1250 Multilith has four form rollers.

2. T. F. The dampening system on the 1250 Multilith has four form rollers.

3. T. F. The inking system form rollers atcually deposit ink on the image areas of the printing plate.

4. T. F. The form rollers of the ink train contact both image and non-image areas at the same time.

5. T. F. The ink receptive properties of the lithographic plate are difficult to destroy.

LEVEL OF PERFORMANCE: For Learning Experience I, you should have answered all 10 items correctly. If you did not have all 10 correct, or if you missed some points or have questions about any additional points, review the material in the information sheet, Dampening and Inking System -- Purpose pp 5 & 6 or check with your instructor if necessary.